

Owyhee Field Office

Chipmunk Group

Soils Resource Specialist Report

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1. Introduction

This Soils Resource Specialist Report contains a compilation and analysis of all data and information available for an allotment that describes the current rangeland health conditions and identifies changes or trends in rangeland health over time. These are used in association with desired conditions, other quantitative monitoring (i.e., sage grouse monitoring), and inventory information as a qualitative evaluation tool to provide early warnings of resource problems in rangeland uplands. This procedure compares 17 indicators to reference Ecological Site Descriptions (USDA NRCS 2010 draft) and expresses a degree of departure from what is expected. The appendices contain monitoring data and maps.

The analysis in this report is the basis for completing the Determination and, ultimately, provides the current conditions that aids in the development of alternatives for the NEPA process. Some additional factors that might influence the current conditions include off-highway vehicles (OHV), wild horse and wildlife concentration, roads, and trails. Current livestock grazing management and other uses are evaluated in the Determination to conclude causes of any unsatisfactory conditions. This report contains three sections that define subgroups of all of the Chipmunk Group allotments. These subgroups are: Jump Creek, Succor Creek, and, Cow Creek.

Background

Standard 1 – Watersheds

Desired Conditions

Idaho Standards for Rangeland Health

Watersheds provide for the proper infiltration, retention, and release of water appropriate to soil type, vegetation, climate, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.

Indicators may include, but are not limited to, the following:

1. The amount and distribution of ground cover, including litter, for identified ecological site or soil-plant associations are appropriate for site stability.
2. Evidence of accelerated erosion in the form of rills and/or gullies, erosional pedestals, flow patterns, physical soil crusts/ surface sealing, and compaction layers below the soil surface is minimal for soil type and landform.

1999 Owyhee Resource Management Plan

Livestock Grazing Management

- LVST 1: Provide for sustained level of livestock use compatible with meeting other resource objectives.
- MGMT ACTIONS: The livestock allocation is the current active permitted use for livestock in the Owyhee Resource Area. In order to meet resource objectives, the forage allocation will be adjusted based upon monitoring and assessment. Evaluation of monitoring data will determine future stocking levels.
- Limit upland forage use to 50 percent unless higher or lower level of use is appropriate to meet standards for healthy rangelands.

Soil Resources

- SOIL 1: Improve unsatisfactory and maintain satisfactory watershed health/condition on all areas.
- SOIL 2: Achieve stabilization of current, and prevent the potential for future, localized accelerated soil erosion problems (particularly on stream banks, roads, and trails).
- MGMT ACTIONS: Implement grazing practices that during and at the end of the grazing season provide adequate amounts of ground cover (determined on an ecological site basis) to support proper infiltration, maintain soil moisture, stabilize soils, and maintain site productivity.

Rangeland Health – All Allotments

Fire History

All documented fire acres from 1960 to the fall of 2012 are summarized for each allotment and display the burn year and number of fires in parentheses if more than one fire occurred during that year. The percentage burned to date reflects the total percentage of area affected within each pasture or allotment and may consist of acres that have been burned multiple times over the decades.

Rangeland Health Field Assessments

Twelve of the 17 indicators utilized in the Rangeland Health Field Assessments (RHFAs) are related to Standard 1 - Watershed Health. The analysis of watershed condition considers both soil stability and hydrologic indicators (Pellant et al. 2005) and displays a natural range of physical and vegetative characteristics (USDA-NRCS 2003). Tables at the beginning of each allotment write-up, beginning with the following section, summarize all indicator ratings and corresponding percentages related to Standard 1 by allotment or pasture. A complete display of indicator ratings can be viewed in Appendix SSR-1.

Ground Cover Trend Data

Ground cover data was monitored at established trend sites and were primarily collected in 2000, 2001, 2003, 2005, 2009, 2010, and 2012, depending on locations. Although in many cases earlier data is available, a statistical comparison was not possible due to variations in the recording style of earlier monitoring efforts. Ground cover trend data sites provide quantitative records that reflect long-term and short-term changes for ground cover, which consist of rock, gravel, biologic crust, persistent and non-persistent litter, and canopy cover. Basal cover and total vegetation data had to be excluded due to inconsistencies in the data and data processing. Because of extensive volume, ground cover data was not included in an appendix but is available upon request from the Owyhee Field Office in Marsing, Idaho.

For this assessment, *long-term* in regards to ground cover trend data represents the full length of time between the first and last reading (e.g., comparing 2000 to 2010 and skipping 2005) and *short-term* reflects a comparison between the 2010 and its immediately previous reading, which is generally 2005. Data may or may not show statistical significance or reflect a directional change in conditions.

Summary of Findings

A summary of findings (Table A) is included to provide for a quick reference of the allotments in regards to meeting Standard 1 – Watersheds.

Table A: Summary of Chipmunk Group findings for Standard 1 - Watersheds

Not Meeting Standard 1 – Livestock is a Causal Factor	Meeting Standard 1 – Livestock is not a Causal Factor	Meeting Standard 1
Blackstock Springs	Alkali-Wildcat**	Baxter*
Burgess FFR	Corral FFR*	Burgess
Elephant Butte	Franconi*	Chimney Pot FFR
Jackson Creek	Stanford FFR*	Chipmunk Field FFR*
Joint		Cow Creek Individual
Madriaga		Ferris FFR
Rats Nest**		Lowry FFR
Sands Basin		Poison Creek
		R Collins FFR*
		Soda Creek
		Texas Basin FFR
		Trout Creek*
		Trout Creek/Lequerica

*not included in this document; determination was previously completed

**in EIS combined as newly configured Wild Rat allotment under Alternatives 2, 3, and 4

The term “at risk” or “red flag” has been applied to several pastures that are meeting Standard 1, meaning that watershed health is satisfactory but that it is near a point where soil and hydrologic function are susceptible to degradation. This takes into consideration a lag in response time, specifically between soils and vegetation, where soils may be resilient enough to withstand resulting adverse effects of declining vegetation conditions over a longer period of time before showing a measurable divergence from reference conditions. Similarly, soils may be the first to show declining conditions while the vegetation community is still relatively robust.

At-risk pastures are more susceptible to unpredictable stressors such as drought, wildfire, weed invasion, and climate change. These already compromised pastures have lower resilience to livestock grazing when coupled with unpredictable stressors and the subsequent potential to move towards not meeting standards. The intention of such a label is to identify those pastures that deserve increased attention, with the idea of altering management when needed to avoid moving towards not meeting in the future.

2. Jump Creek Subgroup

General Setting

The Jump Creek Subgroup allotments are located in Owyhee County, Idaho, just south-southwest of Marsing, Idaho, along the northern front of the foothills of the Owyhee Mountains and from just east of Highway 95 westward to the state line with Oregon. The Jump Creek area encompasses approximately 39,719 acres of public land and contains five livestock grazing allotments: Alkali-Wildcat (514), Elephant Butte (513), Poison Creek (603), Rats Nest (522), and Sands Basin (521).

Elevations range from around 2,324 feet along the northern edge at the base of the foothills (Elephant Butte, pasture 3) to over 5,147 feet in the southeastern portion of the area (Sands Basin, pasture 4). The major landforms in the allotments are rolling to steep foothills with some steep to very steep rocky drainages that bisect the structural benches and plateaus. The major stream systems that flow across public lands are Jump Creek, Squaw Creek, McBride Creek, and Jackson Creek.

The Sands Basin Wild Horse Herd Management Area is located in the Sands Basin allotment and a portion of the Hardtrigger Wild Horse Herd Management Area is located within the pastures 2 and 3 of Elephant Butte and in Rats Nest allotment.

The Jump Creek allotments include the 150-acre Squaw Creek Research Natural Area (RNA) and Area of Critical Environmental Concern (ACEC) and are adjacent to the 612-acre Jump Creek Canyon ACEC, as designated by the Owyhee Resource Management Plan (ORMP) (USDI BLM 1999). Grazing is excluded from the Squaw Creek RNA, prohibited from the Jump Creek Canyon, and restricted along the Jump Creek Canyon rim.

Alkali-Wildcat Allotment

Setting

The Alkali-Wildcat allotment is located in northwestern Owyhee County, Idaho, approximately 10 miles south of Marsing, Idaho (see Map GEN-1). The allotment lies in salt desert shrub land flats above the Snake River Plain and transitions into the rhyolitic foothills of the Owyhee Mountains. The Jump Creek drainage forms a portion of the northwestern boundary, and Highway 95 forms part of the eastern boundary. Elevations range from approximately 2,500 feet near Jump Creek to 4,300 feet on the southernmost boundary of the allotment.

Alkali-Wildcat was reconfigured and combined with Rats Nest to become the new Wild Rat allotment under Alternatives 2, 3, and 4 in the EIS. The reconfiguration includes a reduction of 1,050 acres of the easternmost portion of the allotment that is then converted into a new pasture 6 of the Elephant Butte allotment by using a natural boundary.

Rangeland Health Assessment

Previous Assessment Summary

The Northwest Owyhee Front Rangeland Health Assessment (2001) that includes the Alkali-Wildcat allotment summarized four RHFAs that were conducted in 2000. The results indicated that some accelerated erosion was taking place and listed pedestaling of bunchgrasses within interspaces and flow patterns as the most common indicators. The plant community was negatively influenced by the amount of shrubs, the proportion of increaser to decreaser grass/forb species, and the lack of microbiotic crusts. Adverse ratings on the main watershed indicators were associated with historic grazing practices.

The Alkali-Wildcat determination (2001) declared that the allotment was not meeting Standard 1 but was making significant process toward meeting it. The allotment, however, was not listed as having documented areas of concern in the Northwest Owyhee Front EA (2002).

Current Assessment

Fire History: Fires burned a total of 3,664 acres in 1960 (2), 1972, and 1996 (four fires total; see Map FIRE-1). In 2012, 1,971 additional acres were burned north to south in the central portion of the allotment, resulting in a total of 64 percent of the allotment being burned to date.

Rangeland Health Field Assessment: Three RHFAs were completed in 2007: two on Loamy 10-13" and one on Loamy 10-13", with inclusions of Shallow Claypan 12-16" ecological sites (Appendix SSR-1; Maps ECOL-1 and

RNGE-1). Fifty-seven percent of the indicators are in the none-to-slight range of departure from reference site conditions, 20 percent are in the slight-to-moderate range, and 23 percent are in the moderate range (Table Soil-1). In the summer of 2012, a fire affected one of the RHFA sites (RH1C). It was decided to retain the pre-fire monitoring data to assist in the EIS analysis, although vegetative conditions have changed. As a whole, the Alkali-Wildcat allotment has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-1).

Table Soil-1: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Alkali-Wildcat allotment from 2007 RHFA's (Appendix SSR-1)

Alkali-Wildcat	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(3) s-m	34	57	12	20	14	23	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

The assessment indicates that water flow patterns are slight and dispersed, especially when rocks and gravels are present, as they provide effective armor against erosional processes. The high rock content also stabilizes bare ground, especially where herbaceous cover is lacking. The most common indicators are pedestalled interspatial bunchgrasses that display historic and some active soil erosion, primarily on increasing slope gradients.

Soil surface loss and degradation is increased in shrub interspaces and litter amount is variable, with higher amounts noted where invasive plants, such as cheatgrass, dominate. Two out of three soil stability rating averages collected for each of the sites fall within expected value ranges for soil surface resistance to erosion for the ecological sites. Site 01N05W12* displayed the poorest overall ratings, with moderate conditions for soil and site stability.

Ground Cover Trend: Ground cover trend data were collected at two sites in 2000, 2005, and 2010 (Table Soil-2; Map RNGE-1). Non-persistent litter shows a statistically significant short- and long-term decline, while rock, gravel, biological crust, and persistent litter (after this, referred to as persistent cover except in tables) show a statistically significant long-term and short-term increase. Bare ground was variable with one site increasing and the other decreasing. Canopy cover data remained primarily static.

Table Soil-2: Ground cover data from trend sites for the Alkali-Wildcat allotment

Alkali-Wildcat	Site 01N05W12*		Site 01N05W15	
	Short-term	Long-term	Short-term	Long-term
Bare Ground	I ^s	I	D	D ^s
Rock, gravel, biological crust & persistent litter	I ^s	I ^s	I ^s	I ^s
Non-persistent litter	D ^s	D ^s	D ^s	D ^s
Canopy Cover	S	S	S	I ^s

I=increase, D=decrease, S=remains the same

^svalues are statistically significant

*Site 01N05W12 is considered to be in the newly configured pasture 6 of the Elephant Butte allotment under Alternatives 2, 3, and 4 in the EIS

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☐ Meeting the Standard
☐ Not meeting the Standard, but making significant progress towards meeting
☒ Not meeting the Standard

Rationale for Evaluation Finding

Accelerated soil erosion, such as water flow patterns and pedestalled bunchgrasses, reflect a decrease in watershed function and are primarily associated with historic grazing practices and growing season use. Ground cover trend is inconclusive due to high variability, although one site was influenced by a fire in the 1960s and may still lack proper protection after all these years.

Much of the decline in soil stability and hydrologic function can be associated with a change in deep-rooted bunchgrasses, like bluebunch wheatgrass, to more shallow-rooted species, such as Sandberg bluegrass. The lack of

species diversity and the localized invasion of annuals have compromised soil nutrient replenishment. This decreased ecological function leads to a lack of ability for proper nutrient cycling, hydrologic cycling, and energy flow, and indicates soil and hydrologic function are compromised and that Alkali-Wildcat allotment is not meeting Standard 1.

Elephant Butte Allotment

Setting

The Elephant Butte allotment (0539) is located in northwestern Owyhee County, Idaho, approximately 10 miles south of Marsing, Idaho (see Map GEN-1). Its lower elevation is situated in the salt desert shrub land flats and its higher elevations protrude into the rhyolitic foothills of the Owyhee Mountains. Pasture 3 includes a portion of the Hardtrigger Wild Horse Management Area. The northern boundary adjoins private cropland, the southern boundary includes portions of the Owyhee Foothills, and Highway 95 forms the western boundary. Elevations range from approximately 2,324 feet in the northern flats to 3,356 feet near Alkali Spring in the southwest corner of the allotment.

The Elephant Butte allotment gained a new pasture under Alternatives 2, 3, and 4 in the EIS as Alkali-Wildcat was reconfigured and combined with Rats Nest to become the new Wild Rat allotment. The reconfiguration includes a reduction of 1,050 acres of the easternmost portion of the Alkali-Wildcat allotment that is then converted into a new pasture 6 of the Elephant Butte allotment by using a natural boundary.

Rangeland Health Assessment

Previous Assessment Summary

The Northwest Owyhee Front Rangeland Health Assessment (2001) that includes the Elephant-Butte allotment summarized sixteen RHFA's that were conducted in 1999 and 2000. The results indicated that some accelerated erosion was taking place and listed pedestaling of bunchgrasses within interspaces and flow patterns as the most common indicators. Generally stable conditions were present, however, and supported by high amounts of gravels.

The plant community was negatively influenced by a localized increase of shrubs, a change from decreaser to increaser species, presence of invasive annuals, and the lack of microbiotic crusts that displayed greater impacts where grazing pressure was higher. Higher elevations of the allotment that contain steeper slopes showed improved vegetative components.

The Elephant-Butte Determination (2001) declared that the allotment was not meeting Standard 1 in the lower elevations and listed livestock grazing management practices as a significant factor. Upper pastures were meeting Standards or showed progress toward meeting. In the Northwest Owyhee Front EA (2002), the allotment was listed as having documented areas of concern, especially at lower elevations and in the northernmost portion of pasture 5.

Current Assessment

Pasture 1

Fire: Two fires, in 1981 and 1983, burned a total of 95 acres, affecting 3 percent of the pasture area (Map FIRE-1).

Rangeland Health Field Assessment: Two RHFA's were completed in 2007 in pasture 1: one in Sandy Loam 8-12" with inclusions of Calcareous Loam 7-10", and one in Calcareous Loam 7-10" (Appendix SSR-1; Maps ECOL-1 and RNGE-1). Eighty-five percent of the indicators are in the none-to-slight range of departure from reference site conditions, 10 percent are in the slight-to-moderate range, and 5 percent are in the moderate-to-extreme range (Table Soil-3). As a whole, pasture 1 has a none-to-slight degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-3).

Table Soil-3: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Elephant Butte allotment – pasture 1 from 2007 RHFA's (Appendix SSR-1)

Elephant Butte Pasture 1	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(2) n-s	34	85	4	10	0	0	2	5	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

The assessment for pasture 1 indicates that general soil conditions are stable, based on none-to-slight ratings for the majority of watershed related indicators. A continuous cover of gravels and stones and the presence of biological

crusts across the relatively flat landscape stabilize water flow patterns and reduce bare ground and erosion. In the eastern half of the allotment, sediment movement may increase if soils are physically disturbed where slopes drop below the level lying alluvial plains into adjacent badlands.

The greatest change is visible with a drastic change in the plant community. Where native bunchgrasses and shrubs have been replaced by invasive grasses, infiltration and runoff is rated as moderate to moderate-to-extreme for hydrologic function. Although the remaining watershed related indicators are primarily none-to-slight, the change in plant community composition is inadequate.

Ground Cover Trend: No trend site in pasture 1.

Pasture 2

Fire History: Six fires burned a total of 1,292 acres in 1960, 1961, 1972, 2000 (2), and 2002, affecting 67 percent of the pasture area to date and leaving only the northeastern and southernmost portions unburned (Map FIRE-1).

Wild Horse Management: The Hardtrigger Wild Horse Management Area is within the allotment. In accordance with the 1999 ORMP, the appropriate management level (AML) is 98 horses. However, the population may range from 66 to 130 horses in any given year, which correspond to approximately 1,176 AUMs annually.

Rangeland Health Field Assessment: One RHFA was completed in 2007 in pasture 2 on a Loamy 10-13” ecological site (Appendix SSR-1; Maps ECOL-1 and RNGE-1). Sixty percent of the indicators are in the none-to-slight range of departure from reference site conditions, 10 percent are in the slight-to-moderate range, 20 percent are in the moderate range, and 10 percent are in the moderate-to-extreme range (Table Soil-4). As a whole, pasture 2 has a moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-4).

Table Soil-4: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Elephant Butte allotment – pasture 2 from 2007 RHFA (Appendix SSR-1)

Elephant Butte Pasture 2	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) m	12	60	2	10	4	20	2	10	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

The assessment for pasture 2 indicates that water flow patterns are deep, wide, and continuous, especially where evidence of horse traffic was observed along with cattle trails. Pedestals and terracettes are active and historic and associated with flow paths interspaces that are open and unprotected. Organic matter is low, soil structure is reduced, and biological crusts are missing, which reduces resistance to erosion. Soil surface loss and degradation is rated moderate-to-extreme and can be associated with a change in plant community composition as deep-rooted bunchgrasses are replaced by annuals. Where invasive annuals are present, litter is plentiful but otherwise shows great variability throughout.

Trend: Ground cover trend data were collected in 2000, 2005, and 2010 (Table Soil-5; Map RNGE-1). Bare ground shows variable results of increase and decrease at the two sites while persistent cover was static over the long-term but over the short-term increased at one and decreased at the other site. Non-persistent litter declined short-term, and over the long long-term increased or remained static. Canopy cover is static at one site but shows a significant short-term increase and long-term decrease. As a whole, this reflects a static or decreasing trend in ground cover.

Table Soil-5: Ground cover data from trend sites for Elephant Butte pasture 2

Elephant Butte Pasture 2	Site 1N04W06		Site 01N04W07	
	Short-term	Long-term	Short-term	Long-term
Bare Ground	D	D	I	I
Rock, gravel, biological crust & persistent litter	I ^s	S	D	S
Non-persistent litter	D	I	D	S
Canopy Cover	I ^s	D ^s	S	S

I=increase, D=decrease, S=remains the same

^svalues are statistically significant.

Pasture 3

Fire History: One fire burned 363 acres along the western boundary in 2002, affecting 15 percent of the pasture area (Map FIRE-1).

Wild Horse Management: The Hardtrigger Wild Horse Management Area is within the allotment. In accordance with the 1999 ORMP, the appropriate management level (AML) is 98 horses. However, the population may range from 66 to 130 horses in any given year, which correspond to approximately 1,176 AUMs annually.

Rangeland Health Field Assessment: Two RHFA's were completed in 2007 in pasture 3: one in Calcareous Loam 7-10" with inclusions of Loamy 10-13", and one in Loamy 10-13" ecological sites (Appendix SSR-1; Maps ECOL-1 and RNGE-1). Seventy-eight percent of the indicators are in the none-to-slight range of departure from reference site conditions, 18 percent are in the slight-to-moderate range, and 5 percent are in the moderate range (Table Soil-6). As a whole, pasture 3 has a none-to-slight degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-6).

Table Soil-6: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Elephant Butte allotment – pasture 3 from 2007 RHFA's (Appendix SSR-1)

Elephant Butte Pasture 3	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(2) n-s	31	78	7	18	2	5	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

The assessment for pasture 3 indicates that water flow patterns are non-defined and unconnected. Bare ground is limited to ridges, animal burrows, and is otherwise protected by gravels and reduced where annuals are present. Where invasives dominate, bunchgrasses are lacking and infiltration and nutrient exchange is compromised. Very few crusts were observed but, despite the loose nature of the soil structure susceptible to erosion, watershed-related indicators were primarily rated as none-to-slight and slight-to-moderate. The noted presence of debris, tracks on hillsides, and numerous roads reflects on the high recreational use of the area.

Ground Cover Trend: Ground cover trend data were collected at two sites in 2000, 2005, and 2010 (Table Soil-7; Map RNGE-1). Non-persistent litter shows a statistically significant short- and long-term decline, while persistent cover increased significantly long-term and short-term. Bare ground is variable, with one site increasing and the other showing no change. Canopy cover data remains static over the short-term and decreased significantly long-term.

Table Soil-7: Ground cover data from trend sites for Elephant Butte pasture 3

Elephant Butte Pasture 3	Site 1N04W10		Site 01N04W14	
	Short-term	Long-term	Short-term	Long-term
Bare Ground	I	I ^s	S	S
Rock, gravel, biological crust & persistent litter	I ^s	I ^s	I ^s	I ^s
Non-persistent litter	D ^s	D ^s	D ^s	D ^s
Canopy Cover	S	D ^s	S	D ^s

I=increase, D=decrease, S=remains the same

^svalues are statistically significant

Pasture 4

Fire History: No fires are on record for pasture 4.

Rangeland Health Field Assessment: One RHFA was completed in 2007 in pasture 4 in a Calcareous Loam 7-10" ecological site (Appendix SSR-1; Maps ESD-1 and RR-1). Ninety-five percent of the indicators are in the none-to-slight range of departure from reference site conditions and 5 percent are in the moderate-to-extreme range (Table Soil-8). As a whole, pasture 4 has a none-to-slight degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-8).

Table Soil-8: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Elephant Butte allotment – pasture 4 from 2007 RHFA (Appendix SSR-1)

Elephant Butte Pasture 4	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) n-s	19	95	0	0	0	0	1	5	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

The assessment for pasture 4 indicates that water flow patterns are non-defined and pedestals are absent. Biologic crusts and gravels provide resistance to erosional processes and reduce the potential for soil surface loss. All watershed-related indicators are rated none-to-slight, with the exception of plant community composition and distribution relative to infiltration, which is departing from potential due to the lack of perennial grasses and the dominance of annuals.

Ground Cover Trend: Ground cover trend data were collected at one site in 2000, 2005, and 2010 (Table Soil-9; Map RNGE-1). Bare ground is increased while canopy cover decreased over the short- and long-term. Decreases over the short- and long-term are also observed for non-persistent litter and canopy cover. All long-term data is significant while short-term observations for persistent cover and non-persistent litter are not.

Table Soil-9: Ground cover data from trend sites for Elephant Butte pasture 4

Elephant Butte Pasture 4	Site 1N04W03	
	Short-term	Long-term
Bare Ground	I ^s	I ^s
Rock, gravel, biological crust & persistent litter	I	I ^s
Non-persistent litter	D	D ^s
Canopy Cover	D ^s	D ^s

I=increase, D=decrease

^svalues are statistically significant

Pasture 5

Fire History: Eight fires burned a total of 546 acres in the eastern two-thirds of the pasture in 1960, 1971, 1978, 1981, 1983, 1987 (2), and 2003, affecting 57 percent of the pasture area (Map FIRE-1).

Rangeland Health Field Assessment: One RHFA was completed in 2007 in pasture 5 in a Sandy Loam 8-12” ecological site (Appendix SSR-1; Maps ESD-1 and RR-1). Eighty percent of the indicators are in the none-to-slight range of departure from reference site conditions, 15 percent are in the slight-to moderate range, and 5 percent are in the moderate range (Table Soil-10). As a whole, the pasture 5 has a none-to-slight degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-10).

Table Soil-10: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Elephant Butte allotment – pasture 5 from 2007 RHFA (Appendix SSR-1)

Elephant Butte Pasture 5	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) n-s	16	80	3	15	1	5	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

The assessment for pasture 5 indicates that water flow patterns are non-defined and bare ground is limited to burrows and small areas on toe slopes. Good biological crusts and organic matter are present and annuals provide litter cover that reduces sediment movement. Livestock trails and roads have contributed to compaction. The majority of watershed-related indicators are rated as none-to-slight, with the exception of plant community composition and distribution relative to infiltration which, due to a lack of shrubs and dominance of annuals, is compromised.

Trend: Ground cover trend data were collected at one site in 2000, 2005, and 2010 (Table Soil-11; Map RNGE-1). Bare ground is increased while non-persistent litter decreased over the short- and long-term. A short-term increase

can be observed for persistent cover and otherwise remains static long-term. Canopy cover shows no observable trend.

Table Soil-11: Ground cover data from trend sites for Elephant Butte pasture 5

Elephant Butte Pasture 5	Site 2N04W22	
	Short-term	Long-term
<i>Bare Ground</i>	I	I
<i>Rock, gravel, biological crust & persistent litter</i>	I	S
<i>Non-persistent litter</i>	I	D ^s
<i>Canopy Cover</i>	S	S

I=increase, D=decrease, S=remains the same

^svalues are statistically significant

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

_____ Meeting the Standard

_____ Not meeting the Standard, but making significant progress towards meeting

___x___ Not meeting the Standard

Rationale for Evaluation Finding

Upland watershed Standard 1 is not met in portions of pasture 2. Signs of increased erosion, such as water flow patterns and pedestaled bunchgrasses, reflect a decrease in watershed function, while short-term declines in more durable soil cover are evident in microbiotic crusts, rocks, gravel, and persistent litter. A decline in soil structure, organic matter, and non-persistent litter, along with an increase in bare ground, are also apparent. Although native plant conditions are noted to be in excellent condition along some steeper slopes within pasture 2, the more easily accessible lower elevations and gentler grades display a decline in watershed function. With actual use occurring during the spring and winter, wet soils are especially susceptible to mechanical damage and to increasing bare ground. Livestock grazing under wet conditions has thus been the main cause for the physical impacts to soils.

Besides pasture 2, RHFA's for the allotment show very little to no distinct physical degradation for watershed indicators because most surfaces in the allotment have a high rock and gravel content that protects soils from erosional forces. That is especially the case on the calcareous soils of the salt shrub desert along the gently sloping to flat alluvial plains above the Snake River valley.

Ground cover data from trend sites, however, provide indication that non-persistent litter, and canopy cover are on a general decline or show no improvement. Trend in ground cover also shows a general increase of bare ground in four out of six sites. While persistent litter is the only other measure that shows a general increase in protecting surface soils, the decline in non-persistent litter and the decrease or static state in canopy cover does not reflect an upward trend for the allotment, especially pastures 2, 3, 4, and 5. No ground cover data is available for pasture 1. Based on the declining conditions reflected in the available trend data, pastures 2, 3, 4 and 5 are not capable of maintaining adequate nutrient, energy, and hydrologic cycling though soil stability, with the exception of pasture 2, is not an issue at this time.

Despite the adequate physical state of soil stability across the majority of the allotment, watershed conditions in Elephant Butte are deteriorating due to the invasion of annual grasses and the resulting extreme departure from expected vegetative conditions. Ecological site potential has shifted into another state where a monoculture of annual invasive plants, such as cheatgrass and medusahead, dominate. Although annuals provide spring forage for livestock and cover for watershed protection by effectively reducing raindrop energy and protecting from wind erosion, the presence of annuals affect the biological and chemical aspects of soils and long-term (more than 10 years) rangeland health.

Invasive annuals modify the ecosystem attributes of soil temperature and soil water distribution, provide less root mass and soil stability than perennial bunchgrasses, and, over time, reduce the diversity and cover of microbiotic crusts, promote loss of native plants, and adversely alter fire intervals and impacts (Pellant, 1996). The extremely flammable conditions associated with standing dead cheatgrass within the close proximity of well-travelled and utilized infrastructure in and around the Elephant Butte allotment have the potential to worsen watershed conditions, should vegetation be removed by wildfire. The resulting combination of water erosion on unprotected steeper ground and deflating wind erosion on the flats could promote soil surface loss and degradation, reduce soil productivity, and would add to deteriorating conditions.

Currently, the soil's surface integrity and its ability to provide nutrient cycling are impacted where annual invasive plants are dominating, which is apparent across the allotment but particularly in the lower elevations. With overall biotic integrity displaying an extreme departure due to lack of species diversity and dominance of invasive grasses, soil and hydrologic function is adversely affected. The departures of physical watershed indicators for soil stability and hydrologic function for pasture 2 and the adverse biological and chemical soil impacts from the extreme impacts on native vegetation by invasive annuals lead to the conclusion that Standard 1 in the Elephant Butte allotment is not being met. ORPM objectives are not met where invasive annuals have taken over, especially in pastures 3, 4, and 5.

Poison Creek Allotment

Setting

The Poison Creek allotment (0603) is located in northwestern Owyhee County, Idaho, approximately 10 miles south of Homedale, Idaho (see Map GEN-1). The allotment lies in the rhyolitic Owyhee Mountains and is defined by Flat Top Butte, located near the northern boundary; Sands Basin delineates the southern boundary, Strodes Basin allotment lies to the west, and Jump Creek Canyon forms the eastern boundary. Elevations range from approximately 2,500 feet in the north to over 4,200 feet at the southern boundary on top of the plateau.

Rangeland Health Assessment

Previous Assessment Summary

The Northwest Owyhee Front Rangeland Health Assessment (2001) that includes the Poison Creek allotment summarized three RHFA's that were conducted in 1999 and 2000. Because the monitoring occurred before the 2002 Trimble fire, many of the observations are not applicable due to the removal of the previously unburned vegetative community and post-fire seeding.

The pre-fire observations indicated that some accelerated erosion was taking place and listed pedestaling of bunchgrasses within interspaces, water flow patterns, and soil sealing as the most common indicators. Bare ground was also higher than expected for the ecological site, along with an increased shrub component. The plant community was negatively influenced by a localized increase of shrubs, a change from decreaser to increaser species, presence of invasive annuals, and the lack of microbiotic crusts.

The Poison Creek Determination (2001) declared that the allotment was not fully meeting Standard 1 in portions of the allotment and listed livestock grazing management practices as a significant factor. Other areas of the allotment were meeting Standards or showed progress toward meeting. In the Northwest Owyhee Front EA (2002), the allotment was listed as having documented areas of concern, especially in regards to the plant community and soil surface erosional features.

Current Assessment

Fire History: Six fires burned a total of 3,885 acres in the majority of the upper two-thirds of the pasture in 1981, 1996, 2002, 2007, 2011, and 2012, affecting 74 percent of the allotment area (Map FIRE-1).

Seeding and ESR Report: The Poison Creek allotment was burned in 2002 by the Trimble fire that affected 72 percent of the allotment (Map FIRE-1). In an effort to rehab the fire, the allotment was seeded in the fall of 2002 and winter of 2003 which consisted of 2,006 drilled acres and 3,537 aerially seeded acres. The area was rested from livestock grazing for two growing seasons and desired plant densities were encountered in most areas by 2005 (USDI BLM 2005). On some of the steeper areas around Poison Creek, fewer plants were present and seeding was less effective, but the overall favorable post-fire temperatures and moisture resulted in increased vegetative cover and a reduction in bare ground over 2 years of monitoring (USDI BLM 2005).

Rangeland Health Field Assessment: Two RHFA's were completed in 2008 in a Loamy 10-13" ecological site (Appendix SSR-1; Maps ECOL-1 and RNGE-1). Sixty-five percent of the indicators are in the none-to-slight range of departure from reference site conditions, 28 percent are in the slight-to moderate range, and 8 percent are in the moderate range (Table Soil-12). As a whole, the Poison Creek allotment has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-12).

Table Soil-12: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Poison Creek allotment from 2008 RHFA's (Appendix SSR-1)

Poison Creek	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(2) s-m	26	65	11	28	3	8	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

The two observed sites are located within the same vicinity and reflect the differences between the burned seeded conditions and the unburned native vegetation. The seeded site reflects the majority of the allotment, which was treated during the fall of 2002 and winter of 2003. Overall soil-site stability and hydrologic function ratings were evaluated as none-to-slight departure from what is expected for the site. Soil erosion indicators included water-flow patterns on sloped areas and plant pedestalling, both of which were evaluated as slight-to-moderate departures. Though there was only 10 percent bare ground observed, the flatter topographic areas were slightly to moderately wind scoured.

However, the presence of soil organic matter suggests little erosion has occurred and no rills or gullies were observed. The site appears to be productive, although a monoculture of grasses is present that lacks a deep-rooted shrub component. The seeded mixture contains similar structural components and infiltration functions that were previously filled by the native grass community.

Soil-site stability and hydrologic function ratings on the native area were evaluated as none-to-slight departure from what is expected for the site. There was evidence of past pedestalling and terracettes that were attributed to past soil movement. These indicators were considered a moderate departure from what was expected from the site. Occasional depositional areas were found under sagebrush canopies and in a few lower sloped open areas.

The presence of soil organic matter in the first few inches of soil suggests little erosion has recently occurred and there was less than 10 percent bare ground present, which was mostly stabilized by gravels, litter, rocks, and biological crusts. No water-flow patterns, rills or gullies were observed and plant community and distribution relative to infiltration were appropriate for the site. Productivity was reduced in the shrub community on the native site.

Soil stability tests taken on the seeded and native sites show interspaces to be more susceptible to erosion when compared to areas covered by shrub canopy. Overall ratings for both sites fall below the expected stability values for the ecological site and indicate increased susceptibility to erosion. Organic matter, however, is abundant, and little to no soil surface loss or degradation is observed.

Ground Cover Trend: Ground cover trend data were collected at one site from 1999, 2004, and 2010 (Table Soil-13; Map RNGE-1) – the site was affected by the 2002 Trimby fire. Bare ground increased significantly over the long term but remained static short-term, reflecting post-fire conditions and the seeding. Significant results were measured for increasing non-persistent litter and decreasing persistent cover over both the short- and long-term. Canopy cover is variable and significantly increases short-term but decreases over the long-term. The trend reflects post-fire conditions for long-term results and supports primarily static to improving conditions over the short-term.

Table Soil-13: Ground cover data from trend sites for Poison Creek allotment

Poison Creek	Site 1N05W05	
	Short-term	Long-term
Bare Ground	S	I ^s
Rock, gravel, biological crust & persistent litter	D ^s	D ^s
Non-persistent litter	I ^s	I ^s
Canopy Cover	I ^s	D ^s

I=increase, D=decrease, S=remains the same

^svalues are statistically significant

2012 Field Observations (complete field report available in Project File)

Stark differences can be observed where crested wheatgrass was seeded – it definitely helped in reducing invasion of annuals. However, the drawbacks that can be observed include a change in surface structure of soils. Compaction is

higher, vesicular surface sealing is common, and soils appear heavier with little to no roots penetrating. Bare soil is visible between the planted rows, with moderate gravels aiding in providing cover.

Where unburned, significantly more roots are present along with biological soil crusts. However, waterflow patterns and historic pedestaling are also more common but not too excessive and localized. According to Jake Vialpando, former Range Conservationist for this allotment, the seeding did not appear to be as healthy as in previous years, primarily due to less vegetative cover on the hardened soils.

During a separate trip to the Poison Creek allotment in February 2012, the western boundary of the allotment showed much better seeding conditions. Grasses and forbs have established between the seeded rows and bare ground was less common, while vegetation was more diverse.

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☒ Meeting the Standard
- ☐ Not meeting the Standard, but making significant progress towards meeting
- ☐ Not meeting the Standard

Rationale for Evaluation Finding

Evaluation of the available RHFA and ground cover trend data determined that the slight-to-moderate departure category best reflects the overall watershed condition on the Poison Creek allotment. Although localized soil impacts are recorded, soil and hydrologic integrity and their associated attributes are still maintained and conclude that Standard 1 - Watersheds is being met but soils are considered to be at risk over the long term (more than 10 years) due to post-fire recovery.

The 2002 Trimby fire had the largest impact by affecting approximately 3,885 acres (74 percent of the allotment) at various levels within Poison Creek allotment, which was then rested in 2003 and 2004. Where upland vegetation was burned, shrubs and ground cover were removed or reduced, which presented a challenge due to the dominance of annuals already present along the Owyhee Front. A crested wheatgrass seeding therefore took place in 2002/2003 across 5,543 acres to provide site stability, to reduce the potential invasion of annuals and noxious weeds, and to provide adequate litter and standing plant material for site protection and decomposition to replenish soil nutrients relative to site potential. Refer to Standard 5 for a discussion on the seeding in Poison Creek.

Overall, RHFAs that compared seeded to natural sites show more stable conditions for the seeded site due to productive ground cover establishment, while the native site shows reduced productivity, especially in deep-rooted bunchgrasses. Across the allotment, the seeding is mostly effective in outcompeting cheatgrass compared to areas where post-fire seeding did not occur (USDI BLM 2005).

Field observations in 2012 showed a potential increase in bare soils and associated water flow and soil sealing in the seeded areas, along with compacted conditions. The absence of organic material, microbiotic soil crusts, and roots was evident when compared to the native unburned area, although both lacked diversity and contained a fair amount of pedestaling. In general, the seeding reflected degraded conditions compared to monitoring observations in 2009 (Vialpando 2012, personal communication) but has so far been able to provide for proper nutrient cycling, hydrologic cycling and energy flow within the existing native plant community. Over the long term (more than 10 years), however, the hardened soils and lack of plant diversity may not allow for the proper capture, storage, and management of moisture as compared to reference communities so that sites are considered to be at risk. More time is needed to give the burned and seeded areas an opportunity to recover.

Ground cover trend data reflects the impacts of the fire on persistent cover and canopy cover with a significant decrease in their occurrence, which is to be expected post-fire. Bare ground has been increasing over the long term but remains static over the short term, suggesting that the seeding provides protection and added soil stability to the landscape.

Based on soil stability tests, the increase in canopy interspace and reduction in vegetation that is generally associated within the sagebrush structural group shows a reduction in soil stability that contributes to a higher erosion potential. Where the native sites have been spared from fire, increased pedestaling and wind erosion was recorded within sagebrush-dominated vegetation but remains within expected ranges for the ecological site. Since all other indicators showed no or only minor deviations from soil stability and hydrologic function and overall field observations in 2012 show stable conditions, Standard 1 is met but at risk, should post-fire conditions not improve over the long term.

Rats Nest Allotment

Setting

The Rats Nest allotment (0522) is located in northwestern Owyhee County, Idaho, approximately 10 miles south of Marsing, Idaho (see Map GEN-1). The allotment lies in the rhyolitic Owyhee Mountains with its northern boundary delineated by the Elephant Butte allotment; to the south, west, and east lie the Hardtrigger and Shares Basin allotments. Elevations range from approximately 2,600 feet to over 4,800 feet at Shares Snout.

Rangeland Health Assessment

Previous Assessment Summary

The 2001 Northwest Owyhee Front Rangeland Health Assessment that includes the Rats Nest allotment summarized five RHFAs that were conducted in 2000. The results indicated that some accelerated erosion was taking place and listed pedestaling of bunchgrasses within interspaces and water flow patterns as the most common indicators. Microbiotic crusts were lacking in many places and bare ground was increased, although high gravel content reduced concerns. The vegetation showed changes indicating a move from decreaser to increaser grasses and the shrub component had a higher proportion than compared to reference ecological sites. The Rats Nest Determination (2001) declared that the allotment was not fully meeting Standard 1 in portions of the allotment and listed livestock grazing management practices as a significant factor. In the Northwest Owyhee Front EA (2002), the allotment was listed as having documented areas of concern, especially where areas of pedestaling were present.

Current Assessment

Fire History: One fire burned 3,188 acres in 1972, extending through the middle of the pasture from the northwest to southern end, affecting 58 percent of the allotment area (Map FIRE-1). A distinct line along the vegetation was noted during field observations in 2011 with increased and often exclusive growth of rabbit brush within the fire perimeter compared to adjacent unburned acres dominated by sagebrush.

Wild Horse Management: The Hardtrigger Wild Horse Management Area is within the allotment. In accordance with the 1999 ORMP, the appropriate management level (AML) in Hardtrigger is 89 horses. However, the population may range from 66 to 130 horses in any given year, which corresponds to approximately 1,176 AUMs annually.

Rangeland Health Field Assessment: Two RHFAs were completed in 2007 in a Loamy 10-13" ecological site (Appendix SSR-1; Maps ECOL-1 and RNGE-1). Ninety percent of the indicators are in the none-to-slight range of departure from reference site conditions, 5 percent are in the slight-to-moderate range, and 5 percent are in the moderate range (Table Soil-14). As a whole, the Rats Nest allotment has a none-to-slight degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-14).

Table Soil-14: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Rats Nest allotment from 2007 RHFAs (Appendix SSR-1)

Rats Nest	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(2) n-s	36	90	2	5	2	5	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

The assessments indicate that water flow patterns and bare ground are few, with gravels stabilizing interspaces. Pedestals are rated moderate and common at one site and none-to-slight and non-active at the other. Overall, the majority of watershed-related indicators are rated none-to-slight for both sites and reflect stable soil and watershed function. Productivity for perennials is not inhibited by invasive annuals, but bunchgrasses are generally reduced and sparse while a good distribution of shrubs and forbs is present. Plant community composition and distribution relative to infiltration is intact and litter amount is only slightly reduced.

Ground Cover Trend: Ground cover trend data were collected in 2005 and 2011 at Site 01N05W20 and in 2000, 2005, and 2011 on the remaining four sites (Table Soil-15; Map RNGE-1). Bare ground increased over the short and long term, with the latter being significant allotment-wide. Long-term results for persistent cover show a significant increase, with one site being static. Short-term results increased as well, being significant at one out of four sites. Non-persistent litter shows a significant decrease at all levels, while canopy cover does not display an apparent improving trend over the years and remains static.

Table Soil-15: Ground cover data from trend sites for Rats Nest allotment

Rats Nest	Site 1N04W20	Site 1N05W05		Site 1N05W05		Site 1N05W05	
	Short-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term
<i>Bare Ground</i>	I	I	I	I	I ^s	I	I ^s
<i>Rock, gravel, biological crust & persistent litter</i>	I ^s	I	I ^s	I	I ^s	I	S
<i>Non-persistent litter</i>	D ^s	D ^s	D ^s	D ^s	D ^s	D ^s	D ^s
<i>Canopy Cover</i>	S	I	S	S	S	S	S

I=increase, D=decrease, S=remains the same

^svalues are statistically significant

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☐ Meeting the Standard
☐ Not meeting the Standard, but making significant progress towards meeting
☒ Not meeting the Standard

Rationale for Evaluation Finding

Upland watershed Standard 1 in the Rats Nest allotment is not met. Based on the declining conditions reflected in the available trend data, portions of the Rats Nest allotment are not maintaining adequate nutrient, energy, and hydrologic function. Though rangeland health field assessments identified no soil or hydrologic concerns, contrasting results from four trend sites resulted in higher departure ratings, with bare ground increasing over the short and long term. This undesirable presence of unprotected soils, paired with a decrease in protective non-persistent litter, shows that a decline in litter-producing deep-rooted bunchgrasses and other vegetation is taking place. There is little current indication of improvement for larger vegetation and associated soil and hydrologic function.

Year-round wild horse grazing and prolonged impacts from the 1972 Alkali Springs fire may also contribute to reduced soil and hydrologic function. Even after four decades, a distinct dominance of rabbitbrush and lack of sagebrush structural groups is present. The decreased ecological function, impaired soils, and repeated spring use in the absence of rest indicate that soil and hydrologic function are compromised Standard 1 in the Rats Nest allotment is not met.

Sands Basin Allotment

Setting

The Sands Basin allotment (0521) is located in western Owyhee County, Idaho, approximately 15 miles south of Homedale, Idaho (see Map GEN-1). The allotment lies on the western end of the rhyolitic Owyhee Mountains and includes Sands Basin, a landscape feature that contains accumulations of stream and lake deposits. Strodes Basin and Poison Creek allotments form the northern boundary, Rockville allotment forms the eastern and southern boundaries, and the Oregon state line forms the western boundary. Elevations range from 3,800 feet along Jump Creek to over 5,100 feet in pasture 4.

Rangeland Health Assessment

Previous Assessment Summary

The Northwest Owyhee Front Rangeland Health Assessment (2001) that includes the Sands Basin allotment discussed the results of 12 RHFAs that were conducted in 2000. Because the monitoring occurred before the 2002 Trimby fire, many of the observations are not applicable due to the removal of the previously unburned vegetative community.

The pre-fire observations indicated that some accelerated erosion was taking place in all pastures, especially pasture 4 (in the 2001 document referred to as pasture 5), and listed pedestaling of bunchgrasses within interspaces and water flow patterns as the most common indicators. Pasture 4 (5) displayed signs of mechanical damage to the soil surface from hoof action, while bare ground was also higher than expected for the ecological site, although high gravel content reduced the concern.

The plant community was negatively influenced by a localized increase of shrubs, a change from decreaser to increaser species, presence of invasive annuals, especially in pasture 4 (5), and the lack of microbiotic crusts. The Sands Basin Determination (2001) declared that the allotment was not fully meeting Standard 1 in portions of the allotment and listed livestock grazing management practices as a significant factor. In the Northwest Owyhee Front EA (2002), the allotment was listed as having documented areas of concern, especially in pasture 2, which was seeded and showed signs of active erosional processes, and pasture 4 (5) where signs of mechanical surface damage from livestock were common.

Current Assessment

Pasture 1

Fire History: One fire burned 1,400 acres in 1960, extending through the middle of the pasture from the northwest to southern end, affecting 77 percent of the area (Map FIRE-1).

Seeding: The assessment site lies within the 1961 aerial seeding project that was conducted after the Johnstone fire in 1960. This fire burned approximately 77 percent of the pasture, leaving only the northwest corner of the pasture unscathed by the fire.

Wild Horse Management: The Sands Basin Wild Horse Management Area is located within the allotment. In accordance with the 1999 ORMP, the appropriate management level (AML) in Sands Basin is 49 horses. However, the population may range from 33 to 64 horses in any given year, which corresponds to approximately 588 AUMs annually.

Rangeland Health Field Assessment: One RHFA was completed in 2007 in a Loamy 11-13" ecological site (Appendix SSR-1; Maps ECOL-1 and RNGE-1). Fifty-five percent of the indicators are in the none-to-slight range of departure from reference site conditions, 25 percent are in the slight-to moderate range, and 20 percent are in the moderate range (Table Soil-16). As a whole, pasture 1 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-16).

Table Soil-16: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Sands Basin allotment – pasture 1 from 2007 RHFA's (Appendix SSR-1)

Sands Basin Pasture 1	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) s-m	11	55	5	25	4	20	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

The assessment for pasture 1 indicates that water flow patterns are short and discontinuous, though some are active and contain localized erosion and pedestaled vegetation within the flow paths. Surface gravel and litter is protecting bare ground, but an overall reduction in organic matter in interspaces and historic erosion has led to moderate soil surface loss and degradation that limits infiltration processes at the site. Good bunchgrass and shrub composition, productivity, and distribution are noted, although invasives are scattered throughout the site in trace amounts but are not confined to disturbed areas only.

Ground Cover Trend: Ground cover trend data were collected in 2000, 2005, and 2010 (Table Soil-17; Map RNGE-1). Bare ground significantly decreased over the short and long term. Persistent cover and canopy cover all increased, most of them significantly, while non-persistent litter significantly increased over the short-term and decreased long-term.

Table Soil-17: Ground cover data from trend site for the Sands Basin allotment pasture 1

Sands Basin Pasture 1	Site 1N05W21A	
	Short-term	Long-term
Bare Ground	D ^s	D ^s
Rock, gravel, biological crust & persistent litter	I ^s	I ^s
Non-persistent litter	I ^s	D ^s
Canopy Cover	I ^s	I

I=increase, D=decrease

^svalues are statistically significant

Pasture 2

Fire History: Two fires burned a total of 678 acres in 1962 and 2002, affecting 18 percent of the pasture area (Map FIRE-1).

Wild Horse Management: Sands Basin Wild Horse Management Area is located within the allotment. In accordance with the 1999 ORMP, the appropriate management level (AML) in Sands Basin is 49 horses. However, the population may range from 33 to 64 horses in any given year, which corresponds to approximately 588 AUMs annually.

Seeding: Post-fire rehabilitation efforts included 352 acres of aerial seeding and 354 acres of drill seeding in the fall of 2002 and winter of 2003. The area was rested for two growing seasons afterwards.

Rangeland Health Field Assessment: Two RHFA's were completed in 2007: one in a Loamy 10-13" and one in a Loamy 11-13" with an inclusion of Shallow Claypan 12-16" ecological site (Appendix SSR-1; Maps ECOL-1 and RNGE-1). Ninety percent of the indicators are in the none-to-slight range of departure from reference site conditions and 10 percent are in the slight-to moderate range (Table Soil-18). As a whole, pasture 2 has a none-to-slight degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-18).

Table Soil-18: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Sands Basin allotment – pasture 2 from 2007 RHFA's (Appendix SSR-1)

Sands Basin Pasture 2	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(2) n-s	36	90	4	10	0	0	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

The assessment for pasture 2 indicates that almost all watershed-related indicators are rated none-to-slight and are noted as falling within the expectance range for the ecological sites. Only pedestals are rated slight-to-moderate, with some recent and otherwise mostly historic degradation associated, primarily with Sandberg's bluegrass. Both soil stability rating averages collected for each of the sites fall within expected value ranges for soil surface resistance to erosion for the ecological sites. Few invasives are present, and productivity and reproductive capabilities are within 80 percent of potential.

Ground Cover Trend: There are no trend sites in pasture 2.

Pasture 3

Fire History: One fire burned 1,958 acres in 2002, affecting 99 percent of the pasture area (Map FIRE-1).

Wild Horse Management: The Sands Basin Wild Horse Management Area is located within the allotment. In accordance with the 1999 ORMP, the appropriate management level (AML) in Sands Basin is 49 horses. However, the population may range from 33 to 64 horses in any given year, which corresponds to approximately 588 AUMs annually.

Seeding: Portions of pasture 3 underwent a prescribed burn and drill seeding for crested wheatgrass during the early 1980s. In 2002, the Trimby fire burned approximately 99 percent of pasture 3 and all three RHFA sites. The northernmost RHFA is within an aerial seeding and was established after the fire. Post-fire rehabilitation efforts included 1,882 acres of aerial seeding and 1,488 acres of drill seeding in the fall of 2002 and winter of 2003. The two southern assessment sites are within immediate proximity of each other and are not within a post-fire seeding. The area was rested for two growing seasons after the fire.

Rangeland Health Field Assessment: Three RHFA's were completed in 2007: two in a Loamy 10-13" and one in a Loamy 11-13" ecological site (Appendix SSR-1; Maps ECOL-1 and RNGE-1). Sixty-two percent of the indicators are in the none-to-slight range of departure from reference site conditions, 32 percent are in the slight-to moderate range, 3 percent are in the moderate range, two percent are in the moderate-to-extreme range, and 2 percent are in the extreme range (Table Soil-19). As a whole, pasture 3 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-19).

Table Soil-19: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Sands Basin allotment – pasture 3 from 2007 RHFAs (Appendix SSR-1)

Sands Basin Pasture 3	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(3) s-m	37	62	19	32	2	3	1	2	1	2

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

The assessment for pasture 3 indicates that water flow patterns are mostly short, with few being longer and connected and also containing some pedestals and litter movement. Where invasives, especially cheatgrass and medusahead, are present, bare ground and pedestals are limited. Two out of three soil stability rating averages collected for each of the sites fall within expected value ranges for soil surface resistance to erosion for the ecological sites. Site RH-3A displays a reduced overall rating with slight-to-moderate conditions for soil and site stability and a moderate-to-extreme lack of bunchgrasses that negatively influences infiltration.

Fire has influenced two of the three sites, and different impacts have occurred. Site RH-3C along the northernmost boundary is a seeding that shows little to no departure from expected ecological site characteristics for soil stability. The burned site RH-3B that was not seeded is relatively stable but moderate-to-extreme infiltration impacts are noted and associated with a loss of shrubs and bunchgrasses due to fire and dominance of medusahead. This annual invasive also contributes to an extreme rating for litter amount due to its buildup which, because of its slow decomposition, out-competes desirable bunchgrasses, reduces productivity, and degrades soils with its high silica content.

Ground Cover Trend: There are no trend sites in pasture 3, only trend photo points.

Pasture 4

Fire History: Three fires burned a total of 3,844 acres in 1960, 1974, and 2002, impacting the eastern half and the northwestern corner of the pasture, affecting 66 percent of the pasture area (Map FIRE-1). All three RHFA sites within pasture 4 have been burned, two by the Johnstone fire in 1960 and one by the Trimby fire in 2002. The RHFA sites affected by the Johnstone fire show little to no signs of a remnant seeding. The RHFA site affected by the Trimby fire (RH4B) is not within an area rehabilitated by post-fire seeding.

Wild Horse Management: The Sands Basin Wild Horse Management Area is located within the allotment. In accordance with the 1999 ORMP, the appropriate management level (AML) in Sands Basin is 49 horses. However, the population may range from 33 to 64 horses in any given year, which corresponds to approximately 588 AUMs annually.

Rangeland Health Field Assessment: Three RHFAs were completed: one in a Loamy 11-13” with inclusions of Shallow Claypan 11-13”; one in Shallow Claypan 11-13” that is an inclusion within Loamy 11-13”; and one Loamy 11-13” within a Shallow Claypan 12-16” ecological site (Appendix SSR-1; Maps ECOL-1 and RNGE-1). Fifty percent of the indicators are in the none-to-slight range of departure from reference site conditions, 20 percent are in the slight-to moderate range, 22 percent are in the moderate range, and 8 percent are in the moderate-to-extreme range (Table Soil-20). As a whole, pasture 4 has a moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-20).

Table Soil-20: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Sands Basin allotment – pasture 4 from 2007 RHFAs (Appendix SSR-1)

Sands Basin Pasture 4	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(3) m	30	50	12	20	13	22	5	8	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

The assessment for pasture 4 indicates that water flow patterns are elevated in two out of three sites by being longer and more connected and showing evidence of sheet flow. Both active and historic pedestals are present and associated primarily with interspaces, water flow paths, and Sandberg’s bluegrass. Bare ground is minimal and covered with gravels, debris from annual grasses, or serves as a dusting area for wild horses. Movement of litter is

slight-to-moderate, while the amount of litter was decreased due to a reduction in large, deep-rooted bunchgrasses that, along with a reduction in shrubs, also negatively influences infiltration in areas that burned in 2002.

Two out of three soil stability rating averages collected for each of the sites fall within expected value ranges for soil surface resistance to erosion for the ecological sites. Site RH-4B displays the poorest overall ratings, along with reduced stability in interspaces on Site RH-4C, contributing to erosion and soil surface loss and degradation. Soils are also negatively affected by an increase in annuals, specifically cheatgrass and medusahead, which reduce nutrient flow and long-term productivity.

Ground Cover Trend: Ground cover trend data were collected in 2000, 2005, and 2010 (Table Soil-21; Map RNGE-1). Bare ground significantly decreased over the short and long term. Persistent cover and canopy cover show no trend and remain static, while non-persistent litter increased over the long and short term, with the latter being significant.

Table Soil-21: Ground cover data from trend site for the Sands Basin allotment pasture 4

Sands Basin Pasture 4	Site 1N05W30	
	Short-term	Long-term
Bare Ground	D ^s	D ^s
Rock, gravel, biological crust & persistent litter	S	S
Non-persistent litter	I	I ^s
Canopy Cover	S	S

I=increase, D=decrease, S=remained the same

^svalues are statistically significant

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☐ Meeting the Standard
☐ Not meeting the Standard, but making significant progress towards meeting
☒ Not meeting the Standard

Rationale for Evaluation Finding

Upland watershed Standard 1 in pastures 3 and 4 is not met; pastures 1 and 2 are meeting. Though soil conditions in pasture 3 are fairly stable, there is an extreme decline in hydrologic function related to invasive annuals. Indicators of hydrologic function associated with litter amount and plant community composition and distribution are compromised in pasture 3 and portions of pasture 4, especially when associated with an unusually thick and extensive cover of silica-rich medusahead litter that is altering the moisture and nutrient regime of the soils. As a result, this direct relationship between soil and overall biotic integrity is at an extreme departure due to lack of species diversity and dominance of invasive grasses that adversely affect soil and hydrologic function (see discussion on adverse effects on watershed function from invasive annuals for the Elephant Butte allotment).

In pasture 4, signs of increased erosion, such as water flow patterns and historic and active pedestaled bunchgrasses, reflect a decrease in watershed function. Soil surface resistance to erosion is reduced, especially where native deep-rooted bunchgrasses are missing and where interspaces are not stabilized by persistent cover. Observations during a field trip in 2012 (see project record) confirmed the above stated impacts, along with mechanical damage from hoof action, increased water flow patterns, soil surface sealing, and absent microbiotic crusts. The decreased ecological function, impaired soils, and repeated spring use in the absence of rest indicate that soil and hydrologic function are compromised and that Standard 1 in the Sands Basin allotment is not met.

3. Succor Creek Subgroup

General Setting

The Succor Creek Subgroup allotments are located on the northwest side of the Owyhee Mountains in Owyhee County, Idaho, just south-southwest of Marsing, Idaho (Map GEN-2). The Succor Creek area encompasses approximately 28,107 acres of public land and contains two livestock grazing allotments: Blackstock Springs (0515) and Jackson Creek (0506).

Elevations range from around 4,000 feet at the base of the foothills (Blackstock Springs, pasture 1) within the basin to 7,397 feet on mountain ridges (Jackson Creek, pasture 5). The dominant rock types present are volcanic rhyolites and basalts along the high elevation mountains and plateaus and alluvial fan and basin fill sediments in the valleys.

Soils generally are well drained, clayey or loamy, and shallow to moderately deep. This area supports shrub-grass vegetation characterized by big or low sagebrush, bluebunch wheatgrass, and Idaho fescue. Other common plants include Sandberg bluegrass, rabbitbrush and various annual and perennial forbs. Native and exotic annual grasses have also become established to varying degrees throughout the range and may influence soil and hydrologic function.

Blackstock Springs Allotment

Setting

The Blackstock Springs allotment is located east of Highway 95 approximately 14 miles south of Marsing, Idaho, in Owyhee County and ranges in elevation from approximately 4,000 to 6,200 feet. Slopes vary from 2 to 40+ percent, with water erosion potential ranging from slight to high and wind erosion potential being slight to moderate. The majority of soils in the allotment are loams that contain various amounts of rock and vary in depth from very shallow to very deep. The landscape is dominated by north-southward trending high elevation mountainous volcanic uplands that are dissected by a number of steep drainages that contain ephemeral, intermittent, and perennial streams. Transitional foothills and fan terraces surround the mountain side slopes and give way to stream and lake sediments that make up the adjacent basin deposits at the lower elevation, especially toward the north in pasture 1.

Rangeland Health Assessments

Pasture 1

Fire History: Two fires burned a total of 7,158 acres in 1960 and 1971, affecting 90 percent of the pasture to date (Map FIRE-2).

Rangeland Health Field Assessment: Five RHFA's were completed in 2003: three on Loamy 10-13", one on a Loamy 10-13" inclusion within Shallow Claypan 11-13", and one on a Loamy 13-16" inclusion within a Shallow Claypan 12-16" ecological site (Appendix SSR-1; Maps ECOL-2 and RNGE-2). Forty-eight percent of the indicators are in the none-to-slight range of departure from reference site conditions, 39 percent are in the slight-to-moderate range, and 13 percent are in the moderate range (Table Soil-22). As a whole, pasture 1 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-22).

Table Soil-22: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Blackstock Springs – pasture 1 from 2003 RHFA's (Appendix SSR-1)

Blackstock Springs Pasture 1	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(5) s-m	48	48	39	39	13	13	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion were present in the form of water flow patterns and pedestalled plants, with some terracette formation. These processes are most active in the southeast-central and west-central portions of the pasture where flow paths are more pronounced and often connected with signs of deposition in ponding areas. Pedestalling is very common and active, with roots exposed on the grass species; it is mostly associated with interspatial areas and also includes shrub mounding. The amount of surface gravels is high and accounts for much of the soil cover. There is evidence of historic and active soil loss and an inadequate amount of vegetative litter in the interspatial areas, but sufficient litter is present under shrub canopies. Evidence of physical damage to soils during the spring was found in the west-central portion of the pasture where hoof prints are common.

Soil factors affecting the hydrologic function appear to be adequate on most sites where organic matter structure and content in the surface horizon are appropriate for the site. The interspatial areas have some evidence of physical soil crust formation and low organic matter content in the northwest portion of the pasture, which is primarily due to the low frequency of plants and associated litter that would normally protect the soil from raindrop impact and overland flow.

The plant community indicator, as it relates to hydrologic function, showed a slight to moderate degree of departure, with some sites being influence by past fire activity and seedings. The general perennial bunchgrass component was adequate at all sites, with the exception of the northwest and southeast portions of the pasture that are dominated by

shallow-rooted bunchgrass and invasive grass species, primarily cheatgrass, medusahead, and bulbous bluegrass. Seeding appeared to be unhealthy in the northeast area, while the shrub component was adequate at most sites. Microbiotic soils were found under shrub canopies and are otherwise weakly represented or absent in most areas. The plant community transitions in some portions of the allotment do not allow for the proper capture, storage, and management of moisture as compared to reference communities so that some sites appear to be functioning below an adequate level.

Ground Cover Trend: No trend data available

Pasture 2

Fire History: Two fires burned a total of 155 acres in 1960 and 1971, affecting 3 percent of the pasture to date (Map FIRE-2).

Rangeland Health Field Assessment: Four RHFA's were completed in 2003: one on a Shallow Claypan 11-13", one on a Shallow Claypan 12-16", one on a Loamy 11-13" inclusion within Shallow Claypan 12-16", and one Shallow Claypan 12-16" with inclusions of Loamy 13-16" ecological site (Appendix SSR-1; Maps ECOL-2 and RNGE-2). Thirty-five percent of the indicators are in the none-to-slight range of departure from reference site conditions, 50 percent are in the slight-to-moderate range, 8 percent are in the moderate range, and 8 percent are in the moderate-to-extreme range (Table Soil-23). As a whole, pasture 2 has a moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-23).

Table Soil-23: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Blackstock Springs – pasture 2 from 2003 RHFA's (Appendix SSR-1)

Blackstock Springs Pasture 2	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(4) m	28	35	40	50	6	8	6	8	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of active and historic soil erosion are present at the Shallow-Claypan sites in the form of pedestals and many distinct water flow patterns. At one site (02S05W11), pedestals occur on rocks and mixed species vegetation, and some appear to have been attributed to frost heave that was accentuated by overland flow. Terracette formation is mostly associated with increased slopes. Both indicators rated at a moderate-to-extreme departure from reference conditions at this site and noted a nearby salt lick. The erosional features are most common in the interspatial areas and display evidence of historic soil loss and inadequate litter amount, which limits site stability.

The Loamy site appears to have little sign of active erosion, with flow paths being present but stable. The amount of litter, particularly in the interspatial areas, is inadequate and rated at a moderate departure from reference conditions. Physical damage to the soil by hoof action is evident and is particularly severe in the active trail corridors.

Soil factors affecting the hydrologic function on the Loamy site consisted of adequate organic matter content in the surface layer, along with sufficient soil structure to be rated at a slight-to-moderate departure and aid in protecting the soil from rain drop impact and overland flow. Shallow Claypan sites are similar to the Loamy site, with the exception of reduced organic matter content in the interspatial areas that is due to a lower frequency of plants, biological soil crusts, and associated litter.

Biological soil crusts were weakly represented or absent in most areas, with the exception of one site in the southeast portion of the pasture. The plant community displays a replacement from deep-rooted bunchgrasses to shallow-rooted species and invasive annuals are increasing. This transition does not allow for the proper capture, storage, and management of moisture as compared to reference communities so that sites appear to be functioning below an adequate level. Based on the declining conditions, adequate nutrient, energy, and hydrologic cycling is not maintained so that Standard 1 is not met.

Ground Cover Trend: Ground cover trend data were collected at two sites in 2003, 2009, and 2012 (Table Soil-24; Map RNGE-2). Bare ground and canopy cover remained static at one site and showed some long-term declines at the other location. Persistent cover showed a significant long-term reduction while non-persistent litter significantly increased. The general ground cover shows the trend to be static to declining for the most part with the exception of non-persistent litter.

Table Soil-24: Ground cover data from trend sites for Blackstock Springs pasture 2

Blackstock Springs Pasture 2	Site 02S05W4		Site 02S05W11	
	Short-term	Long-term	Short-term	Long-term
<i>Bare Ground</i>	D	D ^s	S	S
<i>Rock, gravel, biological crust & persistent litter</i>	D	D ^s	I ^s	D ^s
<i>Non-persistent litter</i>	I ^s	I ^s	D ^s	I ^s
<i>Canopy Cover</i>	I	D ^s	S	S

I=increase, D=decrease, S=remained the same

^svalues are statistically significant

Pasture 3

Fire History: One fire burned a total of 171 acres in 1973, affecting 4 percent of the pasture to date (Map FIRE-2).

Rangeland Health Field Assessment: Four RHFA's were completed in 2003: one on a Loamy 13-16" inclusion within Shallow Claypan 12-16", and three on Loamy 16+ inclusions within Shallow Claypan 12-16" ecological sites (Appendix SSR-1; Maps ECOL-2 and RNGE-2). Seventy-six percent of the indicators are in the none-to-slight range of departure from reference site conditions, 19 percent are in the slight-to-moderate range, and 5 percent are in the moderate-to-extreme range (Table Soil-25). As a whole, pasture 3 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-25).

Table Soil-25: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Blackstock Springs – pasture 3 from 2003 RHFA's (Appendix SSR-1)

Blackstock Springs Pasture 3	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(4) s-m	61	76	15	19	0	0	4	5	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion were present on the Loamy sites in the form of pedestalled plants, with some terracette formation and water flow patterns that are longer and more connected than expected. These processes are most active in the northeast portion of the pasture within an old burn (not on record) and are rated a moderate-to-extreme departure from reference conditions. All other sites displayed a slight-to-moderate departure. Ongoing physical damage to the soil surface by hoof action was observed in the central portion of the pasture and was related to trailing activities. Bare ground was minimal and stabilized by evenly distributed gravel. With the exception of the increased water flow patterns in the northeast, the sites appear to be stable, with little sign of active erosion.

Soil factors affecting the hydrologic function appear to be at or near reference levels, with good organic matter content in surface soil layers, good surface structure, and adequate biological soil crusts. The plant community indicator, as it relates to hydrologic function, showed a slight to moderate degree of departure, with many sites still having deep-rooted plant components, although a sharp increase in shallow-rooted bunchgrasses was noted. The plant community transitions allow for the proper capture, storage, and management of moisture as compared to reference communities so that sites appear to be functioning at an adequate level.

Ground Cover Trend: No ground cover data available.

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☐ Meeting the Standard
☐ Not meeting the Standard, but making significant progress towards meeting
☒ Not meeting the Standard

Rationale for Evaluation Finding

Upland watershed Standard 1 in pastures 1 and 2 of the Blackstock Springs allotment is not met; pasture 3 is meeting. The reduction in soil and hydrologic function is associated with altered plant community composition and distribution due to decreased relative abundance of large, deep-rooted native perennial bunchgrasses and an increase in invasive species. As a result, historic and active accelerated erosional processes have increased pedestaling of

plants that, along with accelerated physical damage from hoof action and mechanical damage to soils by livestock, has also affected the biological soil crust component, especially in the interspatial areas.

Soil degradation is also a concern in areas where invasive annuals are increasing, such as in pastures 1 and 2, because shallow root structure provides reduced protection, especially in the latter part of the season as plants die. The majority of disturbances in pastures 1 and 2 occur in the lowlands and foothills, while higher elevations display better plant communities, increased stable soils with elevated rock content, and localized rather than wide-spread disturbance along the uplands springs and intermittent streams.

The generally static and declining trend in pastures 1 and 2 does not project improvement, especially when no rest and limited livestock grazing deferment have been practiced. The decreased ability for proper nutrient cycling, hydrologic cycling, and energy flow due to reduced soil and hydrologic function conclude that Standard 1 for the Blackstock Springs allotment is not met.

Jackson Creek Allotment

Setting

The Jackson Creek allotment is located approximately 4 miles east of Sheaville, Oregon, in Owyhee County, Idaho (Map GEN-1). Elevations range from approximately 4,800 to 7,300 feet. Volcanic mountains, foothills, and piedmonts make up the majority of the landscape and contain slopes that vary from 2 to 60 percent. Water erosion potentials range from slight to severe, while wind erosion potentials range from slight to high. Soils vary in depth from shallow hardpan to very deep and are primarily loamy with differing amounts of subsurface rock. The mountain rangelands commonly produce curl-leaf mountain mahogany, mountain snowberry, Western juniper, mountain big sagebrush, and Idaho fescue. Foothill and piedmont rangelands commonly produce low sagebrush, Idaho fescue, mountain big sagebrush, and bluebunch wheatgrass when they are in the potential natural community.

Rangeland Health Assessment

Pasture 1

Fire History: No fires are recorded for this pasture.

Rangeland Health Field Assessment: Two RHFA's were completed in 2003, both on Shallow Claypan 11-13" ecological sites (Appendix SSR-1; Maps ECOL-2 and RNGE-2). Fifty percent of the indicators are in the none-to-slight range of departure from reference site conditions, 23 percent are in the slight-to-moderate range, 18 are in the moderate, and 10 percent are in the moderate-to-extreme range (Table Soil-26). As a whole, pasture 1 is moderately departing from reference conditions for soil/site stability and hydrologic function (Table Soil-26).

Table Soil-26: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Jackson Creek – pasture 1 from 2003 RHFA's (Appendix SSR-1)

Jackson Creek Pasture 1	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(2) m	20	50	9	23	7	18	4	10	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are present at both sites in the form of water flow patterns that are often distinct with cut edges, deep, and connected. Historic and active pedestaling occurs on mixed species vegetation, some of which possibly can be attributed to frost heave that was accentuated by overland flow. Hoof shearing is common. Both indicators rate at a moderate-to-extreme departure from reference conditions at one site (03S06W25) and are most common in the interspatial areas where there is evidence of extensive soil loss. Bare ground is present but patches appear small and rarely connect. Physical soil crusts resulting from raindrop impacts in interspatial areas that lack cover are evident in the southwest portion of the pasture. Where gravels and cover are present, soils are resistant to erosion and display reduced water flow patterns.

The plant community indicator, as it relates to hydrologic function, shows a moderate degree of departure, with both sites displaying a lack of deep-rooted bunchgrass and a dominance of shallow-rooted species and annuals that are not as efficient in promoting infiltration and other hydrologic function. Compaction was scattered when present and litter amount is adequate and shows now distinct movement. Biological soil crusts are represented at both sites with the exception of the interspatial areas in the southwest portion of the pasture where they are mostly absent.

The main visual feature of the plant community is one where most deep-rooted bunchgrasses are lacking from the community and where shallow-rooted and annual species dominate. Deep rooted shrubs are also underrepresented over much of the area, especially at one site (03S05W30) that has the appearance of an old burn, although no historic records display a fire in the pasture. The plant community transitions do not allow for the proper capture, storage, and management of moisture as compared to reference communities so that sites appear to be functioning below an adequate level and are considered at risk.

Ground Cover Trend: Ground cover trend data were collected at one site in 2003, 2009, and 2012 (Table Soil-27; Map RNGE-2). Bare ground shows a non-significant reduction long-term and otherwise remains static over the short-term. Persistent cover and canopy cover are decreasing significantly long-term, while non-persistent litter shows no short-term change but a significant increase long-term. The data suggest little to no improvement and a reduction in protective ground cover while the undesirable increase in annuals may contribute to the increase in non-persistent litter.

Table Soil-27: Ground cover data from trend sites for Jackson Creek – pasture 1

Jackson Creek Pasture 1	Site 03S06W25	
	Short-term	Long-term
Bare Ground	S	D
Rock, gravel, biological crust & persistent litter	D	D ^s
Non-persistent litter	S	I ^s
Canopy Cover	D	D ^s

I=increase, D=decrease, S=remained the same

^svalues are statistically significant

Pasture 2

Fire History: No fires are recorded for this pasture.

Rangeland Health Field Assessment: One RHFA was completed in 2003 on a Shallow Claypan 11-13” ecological site (Appendix SSR-1; Maps ECOL-2 and RNGE-2). One hundred percent of the indicators are in the none-to-slight range of departure from reference site conditions (Table Soil-28). As a whole, pasture 2 has a none-to-slight degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-28).

Table Soil-28: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Jackson Creek – pasture 2 from 2003 RHFAs (Appendix SSR-1)

Jackson Creek Pasture 2	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) n-s	20	100	0	0	0	0	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

There is little indication of active soil erosion on this site. Indicators of historic soil erosion are present in the form of short and stable flow paths and pedestalled plants that were limited to some Sandberg’s bluegrass. Very little bare ground is present at this site due the amount of litter, vegetative basal matter, and abundant gravels.

Soil factors affecting the hydrologic function consisted of adequate organic matter content in the surface layer, along with sufficient soil structure to be rated at a slight departure. These factors aid in protecting the soil from rain drop impact and overland flow. The plant community indicator, as it relates to hydrologic function, shows a slight degree of departure, with a good relationship of deep-rooted bunchgrasses to shallow-rooted species. Annual grasses are present in the community in small amounts, the shrub component was adequate, and microbotic soil crusts are well represented at the site.

The main visual feature of the plant community is one where most functional and structural groups are well represented and close to reference conditions. These plant communities allow for the proper capture, storage, and management of moisture and appear to be functioning at an adequate level.

Ground Cover Trend: No ground cover data is available.

Pasture 3

Fire History: One fire burned a total of 10 acres on the western fence line in 1994, affecting less than 1 percent of the pasture to date (Map FIRE-2).

Rangeland Health Field Assessment: Two RHFA's were completed in 2003; one is a Shallow Claypan 12-16" inclusion in a Shallow Claypan 11-13", the other is a Shallow Claypan 12-16" ecological site (Appendix SSR-1; Maps ECOL-2 and RNGE-2). Sixty-three percent of the indicators are in the none-to-slight range of departure from reference site conditions, 18 percent are in the slight-to-moderate range, 15 are in the moderate, and 5 percent are in the moderate-to-extreme range (Table Soil-29). As a whole, pasture 3 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-29).

Table Soil-29: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Jackson Creek –pasture 3 from 2003 RHFA's (Appendix SSR-1)

Jackson Creek Pasture 3	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(2) s-m	25	63	7	18	6	15	2	5	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are present in the south-central portion of this pasture in the form of short water flow patterns that are often distinct with cut edges, deep, and connected and more defined in trailing areas. Pedestalled plants are common on mixed species and are historic and active due to exposure of roots, though some pedestalled features can be attributed to frost heave that has been accentuated by overland flow. Both indicators are rated at a moderate to extreme departure from reference conditions and are most common in interspatial areas where there is evidence of soil loss from erosion.

The site located in the north of the pasture shows little sign of active erosion, with almost all indicators rated at none-to-slight. However, both sites contain evidence of mechanical damage to the soil surface from livestock use in the spring in the form of hoof shearing of bunchgrasses and hoof depressions.

Soil factors affecting the hydrologic function consisted of adequate organic matter content in the surface layer, along with sufficient soil structure to be rated at a slight-to-moderate departure. These factors aid in protecting the soil from rain drop impact and overland flow. The plant community indicator, as it relates to hydrologic function, showed a slight degree of departure, with both sites showing a good relationship of deep-rooted bunchgrasses to shallow-rooted species, although invasive annuals are elevated in the north.

The shrub component varies across sites but is generally as expected for a shallow claypan ecological site. Biological soil crusts were mostly absent in the south-central portion of the pasture and well represented at the other site. The main visual feature of the plant community is one where most functional and structural groups are well represented when compared to reference areas and site guides. Though plant communities allow for the proper capture, storage, and management of moisture as compared to reference communities, erosional patterns are elevated and mechanical damage is occurring. The pasture is functioning at a borderline level and is considered at risk.

Ground Cover Trend: Ground cover trend data were collected at one site in 2003, 2009, and 2012 (Table Soil-30; Map RNGE-2). Bare ground shows significant short- and long-term reductions while persistent cover, non-persistent litter, and canopy cover are all increasing or are static. This suggests an overall improving trend for ground cover at this site.

Table Soil-30: Ground cover data from trend sites for Jackson Creek – pasture 3

Jackson Creek Pasture 3	Site 02S05W32	
	Short-term	Long-term
Bare Ground	D ^s	D ^s
Rock, gravel, biological crust & persistent litter	I ^s	S
Non-persistent litter	S	I ^s
Canopy Cover	I	I ^s

I=increase, D=decrease, S=remained the same

^svalues are statistically significant

Pasture 4

Fire History: One fire burned a total of 1,242 acres in 1962, affecting 32 percent of the southern part of the pasture to date (Map FIRE-2).

Rangeland Health Field Assessment: Three RHFA's were completed in 2003; one in a Shallow Claypan 12-16" inclusion in a Loamy 16+", one in a Loamy 16+, and one in a Shallow Claypan 12-16" ecological site (Appendix SSR-1; Maps ECOL-2 and RNGE-2). Forty-seven percent of the indicators are in the none-to-slight range of departure from reference site conditions, 37 percent are in the slight-to-moderate range, and 17 are in the moderate range (Table Soil-31). As a whole, pasture 4 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-31).

Table Soil-31: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Jackson Creek – pasture 4 from 2003 RHFA's (Appendix SSR-1)

Jackson Creek Pasture 4	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(3) s-m	28	47	22	37	10	17	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are present at all sites in the form of water flow patterns with some being distinct, connected, and displaying cut edges. These sites are rated at a moderate departure from reference conditions. Historic pedestalling is rated slight-to-moderate at two sites and moderate at the Loamy 16+ where it is common in flow paths and shows exposed roots when active. Terracette formation is noted as being mostly associated along or at the bottom of slopes where the amount and degree of pedestalling is also elevated due to some increases in overland flow. These are increased in interspatial areas where there is evidence of some historic soil loss.

Soil factors affecting the hydrologic function consist of inadequate amounts of litter on the Loamy 16+ site and in the interspatial areas of one of the Shallow Claypan sites where the amount of surface gravels appears to be stabilizing and protecting the site. The plant community indicator, as it relates to hydrologic function, showed a slight-to-moderate degree of departure, and is displaying a shift from deep-rooted bunchgrasses to one dominated by shallow-rooted species. This is particularly true in the large open interspatial areas, which are now dominated by low structured Sandberg's bluegrass.

The shrub component varies across sites but in general is adequate, while microbiotic soil crusts are weakly represented in most areas. The main visual feature of the plant community is one where many of the deep-rooted bunchgrasses are being replaced by shallow-rooted species and invasive annuals with a basic shrub component. The plant communities, however, continue to allow for the proper capture, storage, and management of moisture and are functioning adequately.

Ground Cover Trend: Ground cover trend data were collected at one site in 2003, 2009, and 2012 (Table Soil-32; Map RNGE-2). Bare ground shows a significant long-term decline, while persistent cover and canopy cover have been increasing over the long-term but otherwise are static over the short-term. Non-persistent cover is static long-term and otherwise decreasing over the short-term. The majority of data are non-significant.

Table Soil-32: Ground cover data from trend sites for Jackson Creek – pasture 4

Jackson Creek Pasture 4	Site 03S05W26	
	Short-term	Long-term
Bare Ground	D	D ^s
Rock, gravel, biological crust & persistent litter	S	I
Non-persistent litter	D	S
Canopy Cover	S	I

I=increase, D=decrease, S=remained the same

^svalues are statistically significant

Pasture 5

Fire History: One fire burned a total of 190 acres in 1962, affecting 37 percent of the pasture to date (Map FIRE-2).

Rangeland Health Field Assessment: One RHFA was completed in 2003 on a Loamy 16+ ecological site (Appendix SSR-1; Maps ECOL-2 and RNGE-2). Seventy percent of the indicators are in the none-to-slight range of

departure from reference site conditions, and 30 percent are in the slight-to-moderate range (Table Soil-33). As a whole, pasture 5 has a none-to-slight degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-33).

Table Soil-33: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Jackson Creek – pasture 5 from 2003 RHFA's (Appendix SSR-1)

Jackson Creek Pasture 5	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) n-s	14	70	6	30	0	0	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

There is little indication of active soil erosion on this site. Slight-to-moderate historic soil erosion is present in the form of flow paths that are short, stable, and mostly associated with increased slope gradients. Pedestalled plants are limited to some Sandberg's bluegrass in the flow path areas and may be affected by frost heave. Little bare ground was observed due an increased amount of litter, vegetative basal matter, and gravels.

Soil factors affecting the hydrologic function consist of adequate organic matter content in the surface layer, along with sufficient soil structure to be rated at a slight departure. These factors aid in protecting the soil from rain drop impact and overland flow. The plant community indicator, as it relates to hydrologic function, shows a slight degree of departure, with deep-rooted bunchgrasses present through most of the site. There are inadequate amounts of native bunchgrasses in some of the interspatial areas where shallow-rooted species and small amounts of invasive annuals are present. The shrub component was sufficient and microbiotic soil crust is adequately represented at the site.

The main visual feature of the plant community is one where most structural and functional groups are represented as compared to reference areas and site guides. These plant communities allow for the proper capture, storage, and management of moisture as compared to reference communities and appear to be functioning at an adequate level.

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☐ Meeting the Standard
☐ Not meeting the Standard, but making significant progress towards meeting
☒ Not meeting the Standard

Rationale for Evaluation Finding

Rangeland Health: Watershed

Upland watershed Standard 1 in pasture 1 is not met; pastures 2, 3, 4, and 5 are meeting, although pasture 3 appears to be functioning at borderline levels due to an increasing presence of water flow patterns and pedestal formation. With a noticeable change in plant communities compared to reference conditions, impending soil degradation is a concern in the future, especially due to an increase in invasive annuals.

In pasture 1, both historic and active accelerated erosional processes have resulted in abundant pedestaling of plants, water flow patterns, and commonly found physical soil impacts by livestock hoof action. Localized compaction is inhibiting plant growth and biological soil crusts are variable, ranging from being present to being greatly reduced or absent, especially in interspatial areas. Repeated spring and early summer season use under wet conditions have promoted mechanical damage to the soil surface and bare ground.

Non-mechanical impacts are associated with altered plant community composition and distribution from a decrease in relative abundance of large, deep-rooted native perennial bunchgrasses and an increase in invasive species. Static or declining trends in pasture 1 project limited to no indications of improvements. As a result, a shift in the plant community has led to accelerated erosion and impacts to upland watershed health, especially with no rest or deferred grazing in place. The decreased ecological function, impaired soils, and repeated spring use in the absence of rest indicate that soil and hydrologic function are compromised and Standard 1 in the Jackson Creek allotment is not met.

4. Cow Creek Subgroup

General Setting

The Cow Creek Subgroup is located in southwest Idaho, east to northeast of Jordan Valley, Oregon (Map GEN-1), and encompasses approximately 32,942 acres of public land. Ten livestock grazing allotments are included in Cow Creek subgroup: Burgess (0572), Burgess FFR (0638), Chimney Pot (1429), Cow Creek (0562), Ferris FFR (0545); Joint (0531), Lowry FFR (0477), Madriaga (0557), Soda Creek (0652); and Trout Creek/Lequerica (0560).

The terrain is undulating to very steep, with most landforms being of volcanic origin. Lower elevation sediment filled basins parallel the Idaho/Oregon state line and gradually turn from gently sloping terrain into steep elevation foothills, benches, mountains, and ridges associated with rhyolite and basalt outcrops. The primary aspect is west to northwest for the upper half of the Cow Creek subgroup and west-to-southwest for the lower portion. Numerous draws and canyons contain perennial and ephemeral streams that generally drain northwest to southwest.

Soils in this group are primarily very shallow to moderately deep and well drained and of clayey to loamy texture, with variable amounts and sizes of surface and subsurface rock fragments. Most soils formed in residuum and alluvium derived predominantly from welded rhyolitic tuff. This area supports a wide variety of vegetation due to elevation differences that range from 4,260 feet in Burgess FFR pasture 1, to 6,980 feet in pasture 3 of the Soda Creek allotment. Shrub-grass vegetation is primarily characterized by big or low sagebrush, bluebunch wheatgrass, and Idaho fescue. Other common plants include Sandberg bluegrass, rabbitbrush, and various annual and perennial forbs. Native and exotic annual grasses have also become established to varying degrees throughout the range. The mountain rangelands commonly produce curl-leaf mountain mahogany, mountain snowberry, western juniper, mountain big sagebrush, and Idaho fescue when they are in the potential natural community.

Burgess Allotment

Setting

Burgess FFR is located on the northwest side of the Owyhee Mountains east of Highway 95 and approximately 18 miles north of Jordan Valley, Oregon, in Owyhee County, Idaho (see Map GEN-1). The dominant rock types are volcanic tuffs at higher elevations and alluvial fan and basin fill sediments in the valleys. Soils generally are well drained, clayey or loamy, and shallow or moderately deep on slopes ranging from 0 to 30 percent, but can reach 50 percent along the north end of pasture 3. Elevations range from approximately 4,600 to 5,000 feet and support shrub-grass vegetation characterized by big or low sagebrush, bluebunch wheatgrass and Idaho fescue. Other common plants include Sandberg bluegrass, rabbitbrush and various annual and perennial forbs. Native and exotic annual grasses have also become established to varying degrees throughout the range.

Rangeland Health Assessment

Pasture 1

Fire History: The site assessments note evidence of past fire in the surrounding area, although none are on record for the allotment.

Rangeland Health Field Assessment: One RHFA was completed in 2003 on a Loamy 13-16" inclusion within Shallow Claypan 12-16" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Sixty percent of the indicators are in the none-to-slight range of departure from reference site conditions and 40 percent are in the slight-to-moderate range (Table Soil-34). As a whole, pasture 1 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-34).

Table Soil-34: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Burgess Allotment – pasture 1 from 2003 RHFA (Appendix SSR-1)

Burgess Pasture 1	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) s-m	12	60	8	40	0	0	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are present in the form of water flow patterns of moderate length that are not always distinct, often follow surface cracks, and leave some cut areas. Historic pedestals are mostly associated with Sandberg bluegrass in bare interspaces, along with occasional non-distinct shrub mounding. Both indicators are rated slight-to-moderate. Bare ground is unconnected and litter is stable and uniformly distributed, along with other organic matter that provides for resistance to erosion, although some historic soil loss was observed. The plant community indicator, as it relates to hydrologic function, shows a none-to-slight degree of departure, with abundant vegetation cover of all functional and structural groups although shrubs are not evenly distributed and invasive annuals are scattered. These plant communities allow for the proper capture, storage, and management of moisture as compared to reference communities and appear to be functioning at an adequate level.

Ground Cover Trend: Ground cover trend data were collected in 2009 and 2012 (Table Soil-2; Map RNGE-35) and show a decrease in bare ground, increase in non-persistent litter, and no change in persistent cover and canopy cover. However, the data could not be compared to earlier monitoring efforts in 1983 due to variations in the recording style. None of the data were significant, although ground cover trend suggests stable conditions.

Table Soil-35: Ground cover data from trend sites for Burgess – pasture 1

Burgess Pasture 1	Site 03S06W26
<i>Bare Ground</i>	D
<i>Rock, gravel, biological crust & persistent litter</i>	S
<i>Non-persistent litter</i>	I
<i>Canopy Cover</i>	S

Pasture 3

Fire History: No fires are recorded for the allotment.

Rangeland Health Field Assessment: One RHFA was completed in 2003 on a Loamy 13-16" inclusion within a Shallow Claypan 11-13" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Fifty-five percent of the indicators are in the none-to-slight range of departure from reference site conditions, 25 percent are in the slight-to-moderate range, and 20 percent are in the moderate range (Table Soil-36). As a whole, pasture 3 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-36).

Table Soil-36: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Burgess Allotment – pasture 3 from 2003 RHFA (Appendix SSR-1)

Burgess Pasture 3	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) s-m	11	55	5	25	4	20	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are present in the form of water flow patterns and pedestals/terraces that were rated with a moderate departure from reference site conditions. The flow paths are longer than expected, sometimes short and connected, wider than deep, and display areas of cut banks and deposition. Historic and active pedestals are present throughout the site and mainly associated with interspaces. Active and historic soil loss is slight-to-moderate, and bare areas are small to moderate in size and associated with flow paths and pedestals. However, since gravel, soil surface organic matter, and abundant roots in the soil profile provide good resistance to erosion, soil surface loss was rated as slight-to-moderate.

The plant community indicator, as it relates to hydrologic function, shows a slight-to-moderate degree of departure. The amount of litter was as expected but lacked even distribution in shrub interspaces. A slight reduction in large deep-rooted bunchgrasses is occurring as they are replaced with shrubs, shallow-rooted bunchgrasses, and scattered invasive plants. The plant community transitions allow for the proper capture, storage, and management of moisture as compared to reference communities so that sites appear to be functioning at an adequate level.

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

☒ Meeting the Standard

_____ Not meeting the Standard, but making significant progress towards meeting
 _____ Not meeting the Standard

Rationale for Evaluation Finding

Watershed indicators show very little departure from expected conditions for the ecological site in pasture 1. Areas in pasture 3, however, contain increased water flow patterns, pedestaling, and terracettes, though none were excessive enough to determine that Standard 1 would not be met. All other soil and hydrologic function-related indicators vary between none-to-slight and slight-to-moderate and reflect stable soils that display historic and some active impacts though abundant gravel, adequate litter, and fair plant diversity are in place to reduce erosion potential. While the biotic function is reduced in localized areas of pasture 1 due to an increase in invasive plants, soil and hydrologic indicators show that watershed function still maintains proper nutrient and hydrologic cycling, and energy flow.

Trends in ground cover using indicators of bare ground, persistent cover, and canopy cover have been indicating a general static trend on the Burgess allotment. Non-persistent litter has been on the increase over the long term and is likely a reflection of proliferating invasive annuals and therefore warrants consideration over the long term. Overall, current livestock management is compatible with attainment of Standard 1 for the Burgess allotment.

Burgess FFR

Setting

Burgess FFR is located on the northwest side of the Owyhee Mountains east of Highway 95 and approximately 18 miles north of Jordan Valley, Oregon, in Owyhee County, Idaho (see Map GEN-1). The dominant rock types are volcanic tuffs at higher elevations and alluvial fan and basin fill sediments in the valley that are defined by the terraces along Succor Creek in pasture 1 and Cow Creek in pasture 2. Soils generally are well drained, clayey or loamy, and shallow or moderately deep on slopes ranging from 0 to 25 percent, but can reach 50 percent in pasture 1. Elevations are between 4,600 to 4,760 feet and support shrub-grass vegetation characterized by big or low sagebrush, bluebunch wheatgrass, and Idaho fescue. Other common plants include Sandberg bluegrass, rabbitbrush, and various annual and perennial forbs. Native and exotic annual grasses have also become established to varying degrees throughout the range.

Rangeland Health Assessment

Pasture 1

The pasture was visited in 2003 but no RHFA assessment was taken due to steep terrain, lack of a continuous representative ecosite, and very little accessible BLM land in the otherwise private pasture. No ground cover trend data is available but photos were taken. However, a field visit was made in the summer of 2012 (see project record) that identified that soils were stable and showed no flow patterns, head cuts, rills, or soils loss.

Pasture 2

Fire History: The site assessments note evidence of past fire, although none are on record for the allotment.

Rangeland Health Field Assessment: Two RHFA's were completed in 2003 on a Shallow Claypan 11-13" inclusion within a Shallow Claypan 12-16" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Forty-eight percent of the indicators are in the none-to-slight range of departure from reference site conditions, 13 percent are in the slight-to-moderate range, 25 percent are in the moderate, and 15 percent are in the moderate-to-extreme range (Table Soil-37). As a whole, pasture 2 has a moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-37).

Table Soil-37: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Burgess FFR – pasture 2 from 2003 RHFA's (Appendix SSR-1)

Burgess FFR Pasture 2	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(2) m	19	48	5	13	10	25	6	15	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Site 03S06W25 is located within an old unrecorded burned area and indicators of soil erosion are present in the form of short water-flow patterns at a slight-to-moderate level, with litter filling in old flow paths. Pedestals and terracettes are commonly associated with Sandberg bluegrass, display roots, and are rated as showing a moderate-to-extreme departure from reference conditions. Bare ground areas are small and associated with pedestals and mechanical disturbance.

The plant community indicator, as it relates to hydrologic function, shows a slight-to-moderate degree of departure, displaying a lack of deep-rooted bunchgrass. Invasive annuals and shallow-rooted species, such as medusahead and bulbous bluegrass, dominate and have taken over. Infiltration and runoff patterns are altered due to the moderate-to-extreme alteration in vegetation displayed by the absence of shrubs and a lack of perennial bunchgrasses. Although litter amount from annual plant species is more than expected and provides for cover, plant community transitions do not allow for the proper capture, storage, and management of moisture as compared to reference communities so that the site appears to be functioning below an adequate level and is considered at risk.

Site 03S06W26 borders an old unrecorded burned area and indicators of soil erosion are present in the form of moderate water flow patterns that are short in duration with some cut areas. Pedestals and terracettes are rated as showing a moderate-to-extreme departure from reference site conditions and are commonly associated with Sandberg bluegrass that expose roots. Bare ground is increased and, although abundant gravel cover is present, they are often connected and variable in size, resulting in a moderate-to-extreme rating as well. Soil surface loss or degradation and resistance to erosion are rated as a moderate departure and appear to be dominated in interspaces where gravels or litter are not abundant, and where microbiotic soil crusts are reduced or absent.

The plant community indicator, as it relates to hydrologic function, shows a moderate degree of departure, displays a lack of deep-rooted bunchgrass, and a dominance of shallow-rooted species and annuals that are not as efficient in promoting infiltration and other hydrologic function. Infiltration and runoff patterns are therefore altered due to a lack of shrubs and large perennial bunchgrasses. The plant community transitions do not allow for the proper capture, storage, and management of moisture as compared to reference communities so that the site appears to be functioning below an adequate level.

Ground Cover Trend: No ground cover trend data is available.

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☐ Meeting the Standard
- ☐ Not meeting the Standard, but making significant progress towards meeting
- ☒ Not meeting the Standard

Rationale for Evaluation Finding

Upland watershed Standard 1 in pasture 2 of the Burgess FFR is not met; pasture 1 is meeting. Water flow patterns show departures from reference conditions and are attributed to changes in the plant community caused by a decrease in relative abundance of large perennial bunchgrasses and a reduction in the small-scale variations of height and roughness of the ground surface. Soil surface loss and degradation have occurred, as evidenced by active pedestals, terracettes, and localized bare ground. This is of greater significance along the northern boundary of the FFR where slopes above Westgate Gulch promote transport over longer distances that are not disrupted by adequate vegetation, gravels, or biotic crusts.

Soil degradation is also a concern in areas where invasive annuals are increasing. The absence of shrubs and the extreme departure from reference conditions caused by invasive plants, primarily medusahead and bulbous bluegrass, have altered infiltration and soil moisture patterns that do not allow for the proper capture, storage, and management of moisture, especially in the latter part of the season as plants die. Taken together, Standard 1 for the Burgess FFR allotment is not met.

Chimney Pot FFR

Setting

Chimney Pot FFR is located on the northwest side of the Owyhee Mountains east of Highway 95 and approximately 12 miles northeast of Jordan Valley, Oregon, in Owyhee County, Idaho (see Map GEN-1). The dominant rock types are volcanic tuffs at higher elevations and alluvial fans along the foothills. Several deep drainages are carved by Swisher Creek, Chimney Creek, and Jackson Gulch. Soils generally are well drained, clayey or loamy, and shallow or moderately deep on slopes ranging between 0 to 20 percent along some of the benches and ridge but can reach

60+ percent along the steep drainages. Elevations range from approximately 4,900 feet in the northeast to 5,500 feet to the south and support shrub-grass vegetation characterized by big or low sagebrush, bluebunch wheatgrass and Idaho fescue. Other common plants include Sandberg bluegrass, rabbitbrush and various annual and perennial forbs. Native and exotic annual grasses have also become established to varying degrees throughout the range.

Rangeland Health Assessment

Fire History: One fire burned a total of 1,222 acres in 1962, affecting 95 percent of the allotment to date (Map FIRE-3).

Rangeland Health Field Assessment: One RHFA was completed in 2001 on a Loamy 13-16" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). One hundred percent of the indicators are in the none-to-slight range of departure from reference site conditions (Table Soil-38).

Table Soil-38: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for the Chimney Pot FFR from 2001 RHFAs (Appendix SSR-1)

Chimney Pot FFR	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) n-s	20	100	0	0	0	0	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

There was little indication of active soil erosion on this site, with all indicators rating as none-to-slight. Water flow patterns show limited departure from reference conditions and are short and broken up by high amounts of rocks, gravel, and bunchgrasses. Some of the interspaces display pedestals that appear to be related to frost heaving, while bare ground is slightly more than expected and related to some historic soil loss in interspaces.

The soil surface shows sufficient organic matter and structure, deep-rooted bunchgrasses are present and vigorous, and only a small amount of invasive shallow-rooted bunchgrasses are observed. The plant communities allow for the proper capture, storage, and management of moisture as compared to reference communities and appear to be functioning at an adequate level.

Ground Cover Trend: No ground cover trend data is available.

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☒ Meeting the Standard
☐ Not meeting the Standard, but making significant progress towards meeting
☐ Not meeting the Standard

Rationale for Evaluation Finding

Watershed indicators show very little departure from expected conditions for the ecological sites. Overall, the plant community and soil conditions on the Chimney Pot FFR are adequate to provide for proper nutrient and hydrologic cycling, and energy flow. No long-term trend ground cover monitoring data are available for the Chimney Pot FFR. The actual use data shows that current grazing is authorized for 4 AUMs, with actual use over the past 10 years occurring at the discretion of the permittee. Overall, Standard 1 for the Chimney Pot FFR allotment is met.

Cow Creek Allotment

Setting

The Cow Creek allotment is located in Owyhee County, Idaho, approximately 1¼ miles east of Jordan Valley, OR (see Map GEN-1). It is split into two parcels, with the southernmost containing pastures 1 and 2, and the northeast parcel (about 20 miles away) containing pastures 3, 4, and 5. Elevations start at 4,500 feet in pasture 1 and are greatest along the Swisher Mountains at 6,100 feet in pasture 3.

The dominant rock types are rhyolite tuffs and basalt flows that define the high elevation volcanic uplands along mountain side slopes, benches, and ridges. Transitional foothills, fan terraces, and alluvium surround the mountainous uplands and make up the lower elevations. Slopes range from 2 to 60 percent and contain soils that are primarily loams with varying amounts and sizes of stone. Potential for water and wind erosion typically varies from

slight to moderate, but may be high for wind in limited areas. Mountain big sagebrush, basin big sagebrush, bluebunch wheatgrass, and Idaho fescue are common in areas where the potential natural communities are present. On soils with higher clay content, low sagebrush is common.

Rangeland Health Assessment

Pasture 1

Fire History: No fires are on record for the allotment.

Rangeland Health Field Assessment: One RHFA was completed in 2001 on a Loamy 11-13" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Sixty-five percent of the indicators are in the none-to-slight range of departure from reference site conditions, and 35 percent are in the slight-to-moderate range (Table Soil-39). As a whole, pasture 1 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-39).

Table Soil-39: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Cow Creek – pasture 1 from 2001 RHFAs (Appendix SSR-1)

Cow Creek Pasture 1	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) s-m	13	65	7	35	0	0	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are present in the form of water flow patterns and pedestals and terracettes that were rated with a slight-to-moderate departure from reference site conditions. Flow paths are generally minor and unconnected but contained evidence of historic pedestal formation. Little bare ground is present and associated with historic soil loss within water flow patterns and bunchgrasses are present in interspaces but are not uniform throughout.

Soil factors affecting the hydrologic function consist of microbiotic soil crust, adequate organic matter content in the surface layer, as well as sufficient soil structure, and are rated none-to-slight. These factors aid in protecting the soil from rain drop impact and overland flow. The plant community indicator, as it relates to hydrologic function, shows a slight-to-moderate degree of departure. Recruitment of deep-rooted bunchgrasses is occurring although invasive grasses are scattered throughout and juniper is present. The plant community transitions allow for the proper capture, storage, and management of moisture as compared to reference communities so that the site appears to be functioning at an adequate level.

Ground Cover Trend: Ground cover trend data were collected at one site in 2001 and 2011 (Table Soil-40; Map RNGE-3). Bare ground as well as persistent cover shows a decline. Non-persistent litter is increasing while canopy cover remains static. None of the results were statistically significant.

Table Soil-40: Ground cover data from trend sites for Cow Creek – pasture 1

Cow Creek Pasture 1	Site 05S06W23A
Bare Ground	D
Rock, gravel, biological crust & persistent litter	D
Non-persistent litter	I
Canopy Cover	S

I=Increase, D=Decrease, S=remains the same

Pasture 2

Fire History: Two fires burned a total of 2,627 acres in 1960 and 2010, affecting 71 percent of the allotment in much of the northern two-thirds of the allotment and near the far southern boundary (Map FIRE-3).

Rangeland Health Field Assessment: Four RHFAs were completed in 2001; one on a Loamy 13-16" inclusion within Loamy 11-13", one on a Shallow Claypan 11-13", and two on a Shallow Claypan 12-16" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Fifty-eight percent of the indicators are in the none-to-slight range of departure from reference site conditions, 35 percent are in the slight-to-moderate, and 8 percent are in the

moderate range (Table Soil-41). As a whole, pasture 2 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-41).

Table Soil-41: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Cow Creek – pasture 2 from 2001 RHFA (Appendix SSR-1)

Cow Creek Pasture 2	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(4) s-m	46	58	28	35	6	8	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are present in the form of water flow patterns and pedestals/terraces that were rated with a slight-to-moderate departure from reference conditions for the two sites located in the old burn. Flow patterns were weakly defined, short and stable, with minor signs of erosional deposition except for the southernmost site, where flow paths were leading to areas of ponding. Pedestaling affects several different species and are mostly historic with only few active ones present in the flow paths. Bare ground was rated slight-to-moderate at two sites and showed surface crusting while otherwise being stabilized by permanent cover, such as rocks and gravels. The southernmost site indicated soil loss that is evidenced by pedestaling in the interspaces and very little litter protection.

Soil factors affecting the hydrologic function consist of uniform distribution of litter and organic matter content in the surface layer across most of the pasture. In the southern portion, microbiotic soil crust are reduced and mainly observed under shrub canopies. Despite being well armored elsewhere, weak soil structure was noted in interspaces, leading to a slight reduction in soil stability. Occasional compaction can be found, though it is not restrictive to root penetration; localized mechanical hoof shear is present, primarily in the south.

The plant community indicator, as it relates to hydrologic function, shows a slight-to-moderate degree of departure at one out of three sites. The main visual feature of the plant community is one where many deep-rooted bunchgrasses are being replaced by shallow-rooted species. The shrub component is on the increase in portions of the allotment and invasive annuals are dominating site 05S06W24 and along roadsides. The pasture is still functioning at an adequate level for Standard 1 but is considered at risk due to increasing exotics and declining conditions towards the southern boundary.

Ground Cover Trend: Ground cover trend data were collected at one site in 2001, 2007, and 2011 (Table Soil-42; Map RNGE-3). Bare ground remained static while both persistent cover and non-persistent litter display a short-term decline and a long-term increase. Canopy cover also declined over the short-term but shows a long-term static trend. None of the results were statistically significant.

Table Soil-42: Ground cover data from trend sites for Cow Creek – pasture 2

Cow Creek Pasture 2	Site 05S06W24	
	Short-term	Long-term
Bare Ground	S	S
Rock, gravel, biological crust & persistent litter	D	I
Non-persistent litter	D	I
Canopy Cover	D	S

I=Increase, D=Decrease, S=remains the same

*values are statistically significant

Pasture 3

Fire History: One fire burned a total of 694 acres in 1960, affecting 58 percent of the allotment across the southern half (Map FIRE-3).

Rangeland Health Field Assessment: One RHFA was completed in 2001 on a Loamy 13-16" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Ninety percent of the indicators are in the none-to-slight range of departure from reference site conditions, and 10 percent are in the slight-to-moderate range (Table Soil-43). As a whole, pasture 3 has a none-to-slight degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-43).

Table Soil-43: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Cow Creek – pasture 3 from 2001 RHFA (Appendix SSR-1)

Cow Creek Pasture 3	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) n-s	18	90	2	10	0	0	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

There was very little indication of active soil erosion recorded for this site. Indicators of historic soil erosion are present in the form of slight-to-moderate accelerated erosion on steeper slopes and none-to-slight historic pedestals. Very little bare ground is present at this site due the amount of litter, vegetative basal matter, and abundant gravels.

Soil factors affecting the hydrologic function consist of adequate organic matter content in the surface layer, along with sufficient soil structure. These factors aid in protecting the soil from rain drop impact and overland flow. The plant community indicator, as it relates to hydrologic function, shows a none-to-slight degree of departure, with a good relationship of deep-rooted bunchgrasses to shallow-rooted species except for a slight imbalance in the eastern portion of the pasture. The shrub component was noted as too high, and no mention of annuals are noted.

The main visual feature of the plant community is one where most functional and structural groups are well represented and close to reference conditions. These plant communities allow for the proper capture, storage, and management of moisture and appear to be functioning at an adequate level.

Ground Cover Trend: Ground cover trend data were collected at one site in 2001, 2007, and 2011 (Table Soil-44; Map RNGE-3). Bare ground is decreasing over the short term but is increasing long term. Persistent cover and canopy cover show a significant short-term and long-term increase, while non-persistent litter is decreasing but significantly only over the short term.

Table Soil-44: Ground cover data from trend sites for Cow Creek – pasture 3

Cow Creek Pasture 3	Site 04S05W31	
	Short-term	Long-term
Bare Ground	D	I
Rock, gravel, biological crust & persistent litter	I^s	I^s
Non-persistent litter	D^s	D
Canopy Cover	I^s	I^s

I=Increase, D=Decrease, S=remains the same

^svalues are statistically significant

Pasture 4

Fire History: Two fires burned a total of 359 acres in 1960 and 1962, affecting 43 percent of the allotment in the northeast corner and along the western boundary (Map FIRE-3).

Rangeland Health Field Assessment: One RHFA was completed in 2001 on a Loamy 13-16” ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Seventy-five percent of the indicators are in the none-to-slight range of departure from reference site conditions, and 25 percent are in the slight-to-moderate range (Table Soil-45). As a whole, pasture 2 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-45).

Table Soil-45: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Cow Creek – pasture 4 from 2001 RHFA (Appendix SSR-1)

Cow Creek Pasture 4	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) s-m	15	75	5	25	0	0	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

There is very little indication of active soil erosion at this site. Indicators of historic soil erosion are present in the form of slight-to-moderate short and unconnected flow paths, and none-to-slight rare pedestals in interspaces and trails. Very little bare ground is present due the amount of litter, vegetative basal matter, and abundant gravels.

Soil factors affecting the hydrologic function consist of adequate organic matter content in the surface layer. The plant community indicator, as it relates to hydrologic function, shows a slight-to-moderate degree of departure, with high canopy cover by shrubs but a decreased bunchgrass component in the interspaces where infiltration capacity is slightly reduced. Annual grasses and juniper are present.

The main visual feature of the plant community is one where most functional and structural groups are well represented and close to reference conditions. These plant communities allow for the proper capture, storage, and management of moisture and appear to be functioning at an adequate level.

Ground Cover Trend: Ground cover trend data were collected at one site in 2001, 2007, and 2011 (Table Soil-46; Map RNGE-3). Bare ground is decreasing, with only long-term data being significant. Persistent cover shows a significant short-term decrease and long-term increase, with non-persistent litter following the same trend, though long-term results are not significant. Canopy cover is significantly increasing over the long term and remains static short term.

Table Soil-46: Ground cover data from trend sites for Cow Creek – pasture 4

Cow Creek Pasture 4	Site 04S05W31	
	Short-term	Long-term
Bare Ground	D	D^s
Rock, gravel, biological crust & persistent litter	D^s	I
Non-persistent litter	D^s	I^s
Canopy Cover	S	I^s

I=Increase, D=Decrease, S=remains the same

^svalues are statistically significant

Pasture 5

Fire History: One fire burned a total of 380 acres in 1962, affecting 27 percent of the allotment in the west-central portion (Map FIRE-3).

Rangeland Health Field Assessment: Two RHFA's were completed in 2001; one on a Shallow Claypan 12-16" inclusion within a Loamy 13-16", and one on a Loamy 13-16" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Sixty-eight percent of the indicators are in the none-to-slight range of departure from reference site conditions, and 18 percent are in the slight-to-moderate range, 10 percent are in the moderate, and five percent are in the moderate-to-extreme range (Table Soil-47). As a whole, pasture 5 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-47).

Table Soil-47: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Cow Creek – pasture 5 from 2001 RHFA's (Appendix SSR-1)

Cow Creek Pasture 5	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(2) s-m	27	68	7	18	4	10	2	5	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are minimal at one of the sites (05S05W03-2A) due to rocks and gravels that break up flow patterns. Evidence of historic pedestals is rated slight-to-moderate. Observations differed at the other site (05S05W03-1A) where long, connected water flow patterns that moved gravels where rated as moderate-to-extreme. Pedestals were also common and rated moderate, along with soil surface resistance to erosion where interspatial areas were covered with silt that impedes infiltration through sealing and some litter movement. It was noted that this site is potentially influenced by runoff from a nearby upslope road. Bare ground areas are small at both sites, rarely connected, and stabilized by gravels and rocks.

Soil factors affecting the hydrologic function consist of adequate amounts of litter and persistent cover that aid in stabilizing and protecting the site. The plant community indicator, as it relates to hydrologic function, shows a slight-to-moderate degree of departure at one site due to increased amounts of shrubs and a shift from deep-rooted

bunchgrasses to one dominated by shallow-rooted species. Invasive plants are noted as moderate, with primarily junipers scattered at both sites. The plant community transitions allow for the proper capture, storage, and management of moisture and appear to be functioning at an adequate level.

Ground Cover Trend: Ground cover trend data were collected at one site in 2001, 2007, and 2011 (Table Soil-48; Map RNGE-3). Bare ground is significantly decreasing over the long-term but remains static short-term. Persistent cover shows a significant short-term increase and a static trend over the long term. Non-persistent litter is significantly decreasing short-term and increasing long-term, while canopy cover displays a long-term significant increase but remains static over the short term. The site suggests an overall static to upward trend.

Table Soil-48: Ground cover data from trend sites for Cow Creek – pasture 5

Cow Creek Pasture 5	Site 04S05W31	
	Short-term	Long-term
Bare Ground	S	D ^s
Rock, gravel, biological crust & persistent litter	I ^s	S
Non-persistent litter	D ^s	I ^s
Canopy Cover	S	I ^s

I=Increase, D=Decrease, S=remains the same

^svalues are statistically significant

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☒ Meeting the Standard
☐ Not meeting the Standard, but making significant progress towards meeting
☐ Not meeting the Standard

Rationale for Evaluation Finding

Watershed indicators show some departure from expected conditions for the ecological sites in all of pastures 1 through 4, though none were excessive enough to determine that Standard 1 would not be met. One area in pasture 5, however, contains elevated levels of water flow patterns, pedestaling, and terracettes that are potentially influenced by runoff from a nearby upslope road. While the biotic function is reduced in areas of pasture 2 and is therefore deemed at-risk due to a departure of the plant community and invasive species, soil and hydrologic indicators show that watershed function still maintains proper nutrient and hydrologic cycling, and energy flow.

Trends in ground cover using indicators of bare ground, persistent cover, and canopy cover have been indicating a general static or improving trend on the Cow Creek allotment, which supports the decision that pasture 5 is meeting Standard 1, despite less-favorable qualitative findings. Non-persistent litter has been on the increase over the long term and is likely a reflection of proliferating invasive annuals and therefore warrants consideration. Overall, Standard 1 for the Cow Creek allotment is met.

Ferris FFR

Setting

Ferris FFR is located on the northwest side of the Owyhee Mountains, east of Highway 95 and approximately 12 miles northeast of Jordan Valley, Oregon, in Owyhee County, Idaho (see Map GEN-1). The dominant rock types are volcanic tuffs at higher elevations and quaternary alluvium making up the valley fill along Cow Creek. Soils generally are moderately to well drained, clayey or loamy, and shallow or moderately deep on slopes ranging between 0 to 25 percent, but can reach 60 percent on the north end of the Swisher Mountains in pasture 3. Elevations extend from approximately 4,700 to 6,000 feet and support shrub-grass vegetation characterized by big or low sagebrush, bluebunch wheatgrass and Idaho fescue. Other common plants include Sandberg bluegrass, rabbitbrush, and various annual and perennial forbs. Native and exotic annual grasses have also become established to varying degrees throughout the range.

Rangeland Health Assessment

Pasture 1

Fire History: One fire burned a total of 811 acres in 1962, affecting 70 percent of the allotment in much of the eastern half (Map FIRE-3).

Rangeland Health Field Assessment: Two RHFA's were completed in 2003 one on a Shallow Claypan 12-16" inclusion, the other on a Loamy 12-16" inclusion – both within a Shallow Claypan 11-13" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Sixty-three percent of the indicators are in the none-to-slight range of departure from reference site conditions, and 25 percent are in the slight-to-moderate range, and 13 percent are in the moderate range (Table Soil-49). As a whole, pasture 1 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-49).

Table Soil-49: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Ferris FFR – pasture 1 from 2003 RHFA's (Appendix SSR-1)

Ferris FFR Pasture 1	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(2) s-m	25	63	10	25	5	13	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are present in the form of very distinct and connected water flow patterns that are long, moderately pronounced, and common throughout the site. Historic pedestals, mostly associated with Sandberg bluegrass, are rated slight-to-moderate along with soil surface loss or degradation that may have taken place after the fire. Bare ground is slightly more common but present in small and unconnected patches.

Soil factors affecting the hydrologic function show a none-to-slight departure from reference conditions due to the presence of abundant rock, gravel, and litter, though microbiotic crusts are lacking. Surface resistance to erosion indicates stable conditions, while some slight-to-moderate historic soil surface loss and degradation is present throughout trail areas where hoof action adds mechanical damage.

The plant community indicators, as they relate to hydrologic function, show a slight degree of departure at one site and were moderate on the other. This reflects the replacement of deep-rooted bunchgrasses with shallow-rooted species and increasing invasive annuals, especially where ventenata, cheatgrass, and bulbous bluegrass are increasing. The site still shows fire impacts, with only some islands of brush present on this Shallow Claypan 12-16" site. The main visual feature of the plant community is one where most functional and structural are at an extreme departure from reference conditions and are not functioning at an adequate level. While watershed function is maintained, the indicators exhibit borderline function of soil and hydrologic processes and are considered at risk.

Ground Cover Trend: No ground cover trend data is available.

Pasture 2

Fire History: One fire burned a total of 13 acres in 1962, affecting 5 percent of the allotment along the lower southeastern boundary (Map FIRE-3).

Rangeland Health Field Assessment: One RHFA was completed in 2003 one on a Loamy 11-13" inclusion within a Shallow Claypan 12-16" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Seventy percent of the indicators are in the none-to-slight range of departure from reference site conditions, and 30 percent are in the slight-to-moderate range (Table Soil-50). As a whole, pasture 2 has a none-to-slight degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-50).

Table Soil-50: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Ferris FFR – pasture 2 from 2003 RHFA's (Appendix SSR-1)

Ferris FFR Pasture 2	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) n-s	14	70	6	30	0	0	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

There is very little indication of active soil erosion on this site. Indicators of historic soil erosion are present in the form of slight to moderate, short, non-distinct flow paths and pedestals in increased traffic areas. Bare ground is rated none-to-slight departure and, when present, occurs in small, unconnected patches.

Soil factors affecting the hydrologic function consist of well-distributed organic matter content in the surface layer, along with litter and gravel. Soil loss is mainly historic, although some hoof shearing on wet soils has degraded the surface and contributes to a slight-to-moderate rating. The plant community indicator, as it relates to hydrologic function, shows a none-to-slight degree of departure with well-distributed shrub canopy and grass cover that promote infiltration. Despite the presence of vigorous deep-rooted bunchgrasses, invasive annuals are present and appear to be expanding.

The main visual feature of the plant community is one where most functional and structural groups are well represented and close to reference conditions. These plant communities allow for the proper capture, storage, and management of moisture and appear to be functioning at an adequate level.

Ground Cover Trend: No ground cover trend data is available.

Pasture 3

Fire History: One fire burned a total of 1,070 acres in 1962, affecting 62 percent of the allotment in the northern two-thirds (Map FIRE-3).

Rangeland Health Field Assessment: One RHFA was completed in 2003 one on a Loamy 13-16" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Fifty percent of the indicators are in the none-to-slight range of departure from reference site conditions, 40 percent are in the slight-to-moderate range, and 10 percent are in the moderate range (Table Soil-51). As a whole, pasture 3 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-51).

Table Soil-51: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Ferris FFR – pasture 3 from 2003 RHFAs (Appendix SSR-1)

Ferris FFR Pasture 3	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) s-m	10	50	8	40	2	10	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are present in the form of moderately rated short water-flow patterns that are associated with trails. Historic pedestalled plants are rare and, when present, are commonly associated with Sandberg bluegrass. They are rated slight-to-moderate, along with soil surface loss or degradation that is not active but is apparent along trails. Bare ground is slightly more common but present in small and unconnected patches scattered through shrub interspaces.

Soil factors affecting the hydrologic function show only a slight-to-moderate departure from reference conditions due to the presence of abundant rock, gravel, and litter. Surface resistance to erosion consists of organic matter content on the surface and abundant litter. The plant community indicator, as it relates to hydrologic function, shows a slight degree of departure, which reflects on the replacement of deep-rooted bunchgrasses with shallow-rooted species and increasing invasive plants. The plant community, however, has been heavily utilized and appears to be functioning below an adequate level so that soil and hydrologic function are considered to be at risk.

Ground Cover Trend: No ground cover trend data is available.

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☒ Meeting the Standard
☐ Not meeting the Standard, but making significant progress towards meeting
☐ Not meeting the Standard

Rationale for Evaluation Finding

Indicators in pastures 2 and 3 include active accelerated erosional processes but are otherwise deemed stable due to abundant gravel stabilizing the surface. Past fire impacted pasture 1, which is still reflected in a lack of shrubs, while historic and current use of native bunchgrasses in these pastures has reduced the density, composition, and vigor of these species, especially in pasture 3. As a result, all three pastures contain moderate to moderate-to-extreme levels of invasive plants, especially ventenata, cheatgrass, and bulbous bluegrass, and display an increase in shallow-rooted bunchgrasses that have been replacing deep-rooted bunchgrasses. While the biotic function is reduced in pastures 1

and 3, soil and hydrologic indicators show that watershed function still maintains proper nutrient and hydrologic cycling, and energy flow through pastures 1 and 3 are considered to be at risk. Overall, Standard 1 in the Ferris FFR allotment is met.

Joint Allotment

Setting

The Joint allotment is located in Owyhee County, Idaho, along the Idaho/Oregon state line approximately 10 miles northeast of Jordan Valley, Oregon (see Map GEN-1). The elevations range from 4,760 to 5,795 feet and extend across landform features that are volcanic in origin, with rhyolite tuffs at higher elevations and alluvial fan and fill sediments in the valley. Soils in the allotment are shallow to moderately deep, well drained, and are clayey to loamy with varying amounts of surface and subsurface rock fragments. These soils formed in residuum and alluvium that was derived predominantly from welded rhyolitic tuff and extend across slopes that range from 0 to 5 percent along the terraces of Soda Creek and Cow Creek to 60 percent along the steep drainages and side slopes in pastures 2 and 4. The upland plant communities are dominated by mountain big sagebrush with an understory of Idaho fescue, bluebunch wheatgrass, bottlebrush squirreltail, and slender wheatgrass.

Rangeland Health Assessment

Pasture 2

Fire History: One fire burned a total of 666 acres in 1962, affecting 41 percent of the allotment in the eastern half (Map FIRE-3).

Rangeland Health Field Assessment: Two RHFA's were completed in 2003, both on a Loamy 13-16" inclusion on a Shallow Claypan 11-13" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Thirty-four percent of the indicators are in the none-to-slight range of departure from reference site conditions, 33 percent are in the slight-to-moderate range, 23 percent are in the moderate range, and 10 percent are in a moderate-to-extreme range (Table Soil-52). As a whole, pasture 2 has a moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-52).

Table Soil-52: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Joint – pasture 2 from 2003 RHFA's (Appendix SSR-1)

Joint Pasture 2	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(2) m	14	34	13	33	9	23	4	10	0	0

Indicators of soil erosion are present at both sites in the form of water flow patterns that are wide, deep, often long, and more defined in trail areas. Terracettes and historic and active pedestals with exposed roots are found mainly in bare interspaces but also under plant canopies. These indicators are rated at a moderate or moderate-to-extreme departure from reference conditions for the Loamy 13-16" sites and are most common in interspatial areas where there is evidence of soil loss from erosion. Bare areas are rated slight-to-moderate and moderate, especially in flow paths and along trails.

Soil factors affecting the hydrologic function consist of good organic matter content and litter on the surface layer, especially under plant canopies, but much less in interspaces. Gravel is abundant at one site and helps to provide surface resistance to erosion. The plant community indicator, as it relates to hydrologic function, shows a moderate and slight-to-moderate degree of departure, with both sites noting an increase in shrubs and an imbalance between deep-rooted and shallow-rooted species. Despite the plant communities allowing for the proper capture, storage, and management of moisture as compared to reference communities, and appearing to be functioning at an adequate level, this area is exhibiting compromised watershed and hydrologic processes that is also elevated by the moderate-to-extreme presence of invasive plants in localized areas.

Ground Cover Trend: No ground cover trend data is available.

Pasture 3

Fire History: One fire burned a total of 1,069 acres in 1962, affecting 93 percent of the pasture everywhere but along the far western boundary (Map FIRE-3).

Rangeland Health Field Assessment: Three RHFA's were completed in 2003; one on a Shallow Claypan 12-16", one on a Loamy 13-16" inclusion on a Shallow Claypan 12-16", and one on a Loamy 13-16" inclusion in a Shallow Claypan 12-16" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Thirty-eight percent of the indicators are in the none-to-slight range of departure from reference site conditions, 18 percent are in the slight-to-moderate range, 35 percent are in the moderate range, and 8 percent are in a moderate-to-extreme range (Table Soil-53). As a whole, pasture 3 has a moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-53).

Table Soil-53: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Joint – pasture 3 from 2003 RHFA's (Appendix SSR-1)

Joint Pasture 3	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(3) m	23	38	11	18	21	35	5	8	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are present at all sites in the form of continuous water flow patterns of various length, occasional cut areas, and evidence of sheet erosion and ponding. These result in a moderate-to-extreme rating on two sites and a slight-to-moderate rating at 04S05W09. Terracettes and historic and active pedestals with exposed roots are found mainly within flow paths, while some shrubs also display a pedestalled appearance. Two out of three sites contain moderate levels of bare ground that are lacking expected protection from reduced litter and microbiotic crusts, with only site 04S06W12 being rated at none-to-slight. Mechanical hoof damage is noted and often visible throughout most of the interspaces.

Soil factors affecting the hydrologic function consist of decreased levels of persistent cover, organic matter, litter, and only localized increases in gravels, leading to moderate ratings for soil surface resistance to erosion and soil surface loss and degradation. The plant community indicator, as it relates to hydrologic function, shows a primarily moderate degree of departure due to increases in shrubs and an imbalance between deep-rooted and shallow-rooted bunchgrasses and localized increases in invasive plants, especially near the western boundary. The plant community transitions do not allow for the proper capture, storage, and management of moisture as compared to reference communities so that the site appears to be functioning below an adequate level. Watershed-related indicators exhibit compromised soil and hydrologic processes.

Ground Cover Trend: Ground cover trend data were collected at one site in 2009 and 2012 (Table Soil-54; Map RNGE-2). Bare ground shows a significant decrease, while persistent cover is increasing and non-persistent litter is decreasing. No data is available for canopy cover. Ground cover trend suggests slight improvements, though the primarily non-significant or missing data does not reflect a definite upward trend.

Table Soil-54: Ground cover data from trend sites for Joint – pasture 3

Joint Pasture 3	Site 04S05W8
Bare Ground	D^s
Rock, gravel, biological crust & persistent litter	I
Non-persistent litter	D
Canopy Cover	No Data

I=Increase, D=Decrease

^svalues are statistically significant

Pasture 4

Fire History: Two fires burned a total of 1,446 acres in 1962 and 2006, affecting 100 percent of the pasture (Map FIRE-3).

Rangeland Health Field Assessment: One RHFA was completed in 2003 on a Loamy 13-16" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). The site burned in the Chubby Spain fire in 2006 so that the previous assessment does not reflect the most recent conditions. No ground cover trend data is available but photos were taken. However, there is not enough information to determine conditions from RHAs.

Emergency Stabilization Rehabilitation (ESR): A 2009 monitoring closeout summary report for the Chubby Spain fire (USDI BLM 2009) reflects on the recovery that has taken place after aerial seeding of the burned areas of the

Joint, Franconi, and Soda Creek allotments. Since the RHA site for Joint pasture 4 was burned over, the ESR data serves as a monitoring report to provide for conditions in the pasture. Although the three ESR monitoring points are located in the Soda Creek allotment, all locations are situated on Loamy 13-16" ecological sites, which match the burned RHA plot ESD. One of the sites (CS3) is situated just south across the fence line from the lost RHA plot. The close vicinity, similar seeding treatment, and comparable landscape and ecological site were therefore the deciding factors to extrapolate the ESR data to interpret conditions in pasture 4 in absence of other available monitoring.

The ESR report indicates fair to good canopy and basal cover that is successfully providing resistance to erosion. Few invasive species and a good diversity of perennial grasses, forbs, and shrubs are present and likely contribute to the substantial reduction in bare ground that has occurred since the fire. Sites appear to be recovering well and meeting the objectives of the ESR project. Though it will take more time for post-fire conditions to further improve, pasture 4 remains compatible with attainment of Standard 1.

Pasture 5

Pasture 5 is part of the Ferris FFR.

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☐ Meeting the Standard
- ☐ Not meeting the Standard, but making significant progress towards meeting
- ☒ Not meeting the Standard

Rationale for Evaluation Finding

Upland watershed Standard 1 in pastures 2 and 3 are not met due to declining conditions in soil and hydrologic function. Accelerated erosional processes and water flow patterns have caused an increase in bare ground and pedestaling of plants; trails are common and have affected the biological soil crust component in the interspatial areas. The primary causes for soil degradation are associated with mechanical damage to soils by livestock hoof action and increasing invasive annuals.

Sediment movement may be relatively short to non-existent on flat terrain but is of greater significance where slopes promote transport over longer distances that are not disrupted by deep-rooted vegetation, gravels, or biotic crusts. The variability of slopes in the Joint allotment and the often very steep topography increases erosion potential and promotes delivery of sediments into adjacent riparian areas.

Much of the available data for pasture 4 was deemed unusable after the 2006 Chubby Spain fire. Emergency Stabilization and Rehabilitation (ESR) monitoring (2009), however, found the burn area to be on a recovering path after being rested for several years. The pasture needs to be re-evaluated over time, especially for invasive species. Soil degradation is a concern in areas where invasive annuals are increasing, such as in pastures 2 and 3, as shallow root structure provides reduced protection, especially in the latter part of the season as plants die. The decreased ecological function, impaired soils, and repeated spring use in the absence of rest indicate that soil and hydrologic function are compromised and Standard 1 in the Joint allotment is not met.

Lowry FFR

Setting

Lowry FFR is located on the northwest side of the Owyhee Mountains east of Highway 95 and approximately 2 miles east of Jordan Valley, Oregon, in Owyhee County, Idaho (see Map GEN-1). The dominant rock types are volcanic tuffs at higher elevations and stream deposits and terraces along the Trout Creek drainage. Soils generally are well drained, clayey or loamy, and shallow or moderately deep on slopes ranging between 0 to 25 percent along the side slopes, with some areas exceeding 50 percent. Elevations range from approximately 4,470 to 4,600 feet and contain developed pastureland along the creek bottom and shrub-grass vegetation in the adjacent drier uplands.

Rangeland Health Assessment

Fire History: One fire burned a total of 0.03 acres in 2010, affecting less than 1 percent of the allotment in the northeastern corner (Map FIRE-3).

Rangeland Health Field Assessment: One RHFA was completed in 2001 on a Shallow Claypan 12-16” ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). In August 2012, allotment boundaries were updated and adjusted and portions of the northeast corner were combined with Cow Creek allotment pasture 2, which now contains that monitoring point. There are no additional data available for Lowry FFR. However, a field visit was made on 8/31/2012 (see project record) that identified that soils were stable and showed no flow patterns, head cuts, rills, or soils loss. Due to very high amounts of invasive annuals, Lowry FFR was evaluated and passed under Standard 6 (Exotics) rather than Standard 4 (Upland Vegetation).

Ground Cover Trend: No ground cover trend data is available.

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☒ Meeting the Standard
☐ Not meeting the Standard, but making significant progress towards meeting
☐ Not meeting the Standard

Rationale for Evaluation Finding

Observations made during a 2012 on-site field visit by field office personnel (see project record) show very little to no departure of soils from expected conditions. Despite the dominance of exotics, the soil conditions on the Lowry FFR are adequate to provide for proper nutrient and hydrologic cycling, and energy flow. Overall, Standard 1 in the Lowry FFR allotment is met.

Madriaga Allotment

Setting

The Madriaga allotment is located in Owyhee County, Idaho, approximately 9 miles northeast of Jordan Valley, Oregon (see Map GEN-1). The allotment is divided into two pastures; pasture 1 is located approximately 3 miles east of the Idaho/Oregon state line, and pasture 2 is located adjacent to the state line. Most landform features are volcanic in origin and contain soils that formed in residuum and alluvium derived predominantly from welded rhyolitic tuff on elevations that range from 4,840 to 6,000 feet in pasture 1, and 4,700 to 5,230 feet in pasture 2. The majority of the soils in the allotment are shallow to moderately deep, and poor to well drained clayey to loamy soils that vary in surface and subsurface rock fragments. Slopes are 0 to 20 percent on the basin fill and at lower elevations but can exceed 60+ percent along the steeper mountain side slopes and outcrops in pasture 1. Upland plant communities are characterized as shrub-grassland communities that include mountain mahogany and snowberry at higher elevations.

Rangeland Health Assessment

Pasture 1

Fire History: One fire burned a total of 800 acres in 1962, affecting 30 percent of the allotment in the eastern half (Map FIRE-3).

Rangeland Health Field Assessment: Four RHFA's were completed in 2003; one on a Loamy 12-16” inclusion within Shallow Claypan 11-13”, two on a Shallow Claypan 11-13”, and one on a Shallow Claypan 12-16” inclusion within a Loamy 16+ ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Fifty-five percent of the indicators are in the none-to-slight range of departure from reference site conditions, 40 percent are in the slight-to-moderate range, and 5 percent are in the moderate range (Table Soil-55). As a whole, pasture 1 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-55).

Table Soil-55: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Madriaga from 2003 RHFA's (Appendix SSR-1)

Madriaga Pasture 1	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(4) s-m	44	55	32	40	4	5	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

At RH1A in the northwestern portion of the pasture, water flow patterns were mostly short and unconnected, and pedestaled Sandberg bluegrass plants were noted in interspaces, particularly associated with trails. Bare ground was slightly higher than expected, but bare patches were not commonly connected. Some evidence of historic soil loss was noted, but the soil A horizon was intact throughout the majority of the site. The indicator of plant community composition and distribution relative to infiltration and runoff was rated as slight-to-moderate. The plant community supports structurally diverse species, but large perennial bunchgrasses, such as bluebunch wheatgrass, tend occur under shrub canopy, while smaller perennial bunchgrasses, such as Sandberg bluegrass, occupy the shrub interspaces.

At RH1B and RH1C Shallow Claypan sites in the central portion of the pasture, water flow patterns were mostly short and unconnected. Pedestaled Sandberg bluegrass was observed, occasionally with pronounced cut areas and/or exposed roots. Bare ground was slightly higher than expected, while litter was slightly lower. The indicator of plant community composition and distribution relative to infiltration and runoff was rated as slight-to-moderate.

The plant community supports structurally diverse species, but large perennial bunchgrasses such as bluebunch wheatgrass tend to occur under shrub canopy, while smaller perennial bunchgrasses such as Sandberg bluegrass occupy the shrub interspaces. Soil surface resistance to erosion is reduced in areas associated with trailing and patches of bare ground but is rated as slight-to-moderate overall. Soil surface loss appeared to be mostly historic, though some evidence of active erosion was noted. Trailing and pugging when soils are saturated were noted as affecting surface soil structure in some portions of RH1C.

At RH1D in the northeastern portion of the pasture, the site resembles reference conditions in terms of the amount and distribution of bare ground, soil surface resistance to erosion, and plant community composition and distribution. Plant pedestals and soil surface loss and degradation were noted near the edge of a cliff, but these indicators were near reference conditions across the majority of the site.

Ground Cover Trend: No ground cover trend data is available.

Pasture 2

Fire History: No fires are recorded for this pasture.

Rangeland Health Field Assessment: Three RHFA's were completed in 2003; two on a Shallow Claypan 12-16", and one on a Loamy 12-16" inclusion within Shallow Claypan 12-16" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Fifty-three percent of the indicators are in the none-to-slight range of departure from reference site conditions, 40 percent are in the slight-to-moderate range, and 7 percent are in the moderate-to-extreme range (Table Soil-56). As a whole, pasture 2 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-56).

Table Soil-56: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Madriaga from 2003 RHFA's (Appendix SSR-1)

Madriaga Pasture 2	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(3) s-m	32	53	24	40	0	0	4	7	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

At RH2A in the northwestern portion of the pasture, moderate-to-extreme ratings were indicated for water flow patterns and pedestals/terraces. Water flow patterns were longer and more distinct than expected and cut areas were commonly found along with some litter and soil movement. Active pedestals with exposed roots were noted throughout the site, particularly on small interspatial bunchgrasses. Bare ground was slightly higher than expected for the site and was associated with water flow patterns and trailing areas. The indicator of plant community composition and distribution relative to infiltration and runoff was rated as slight-to-moderate, supporting structurally diverse species. Large perennial bunchgrasses, such as bluebunch wheatgrass, tend occur under shrub canopy, while smaller perennial bunchgrasses such as Sandberg bluegrass occupy the shrub interspaces.

At RH2B, a site in the central portion of the pasture, water flow patterns and pedestals/terraces were slightly higher than expected. Cover of microbiotic soil crusts was noted as being somewhat reduced in interspaces, impacting soil surface resistance to erosion. Soil surface loss and degradation appeared to be mostly historic in nature, with the A horizon missing in some places. Rock and gravel are currently stabilizing soils and providing protection from raindrop impact. The indicator of plant community composition and distribution relative to

infiltration and runoff was rated as slight-to-moderate. The plant community supports structurally diverse species, but large perennial bunchgrasses such as bluebunch wheatgrass tend occur under shrub canopy, while smaller perennial bunchgrasses such as Sandberg bluegrass occupy the shrub interspaces.

At RH2C, water flow patterns are somewhat longer and more pronounced than expected at this site, as are pedestals on interspatial bunchgrasses. Some historic soil loss or movement was noted at this site, which is otherwise stabilized by rock and adequate plant cover. Plant community composition and distribution relative to infiltration and runoff were similar to reference conditions, though the shrub component was somewhat higher than expected.

Ground Cover Trend: Ground cover trend data were collected at one site in 2003, 2009, and 2012 (Table Soil-57; Map RNGE-2). Bare ground and persistent cover is decreasing significantly over the short and long term. Non-persistent litter is significantly increasing, while canopy cover remains static. This suggests some improvements for bare ground, potentially from non-persistent litter, which may reflect an increase in annuals, while more persistent ground cover is static or reduced.

Table Soil-57: Ground cover data from trend site for Madriaga – pasture 2

Madriaga Pasture 2	Site 04S06W11	
	Short-term	Long-term
Bare Ground	D ^s	D ^s
Rock, gravel, biological crust & persistent litter	D ^s	D ^s
Non-persistent litter	I ^s	I ^s
Canopy Cover	S	S

I=Increase, D=Decrease, S=remains the same

^svalues are statistically significant

2012 Field Observations (complete field report available in Project File)

A stop near the trend site revealed plentiful enlarged and connected water flow patterns and evidence of use during wet conditions, with widespread damage from mechanical hoof shearing. Extensive active and historic pedestaling showed root exposure and heavy grazing impacts on remaining pedestaled grasses. Some surface gravel is present but does not provide continuous cover. Surface sealing is apparent in localized areas. A nearby stream drainage (dry) shows impacts from grazing along the stream banks, bottom, and adjacent surrounding upland soils. Hoof shearing suggests heavy use that has led to widening and unstable banks.

Low sage, cheatgrass, and sandbergs dominate with bunchgrasses showing stubble heights down to 1 to 2 inches on the shallow claypan soils. Some sagebrush was pedestaled. Weed patches of mustards are present but erosion is localized since grasses and weeds provide cover, litter, and debris in these areas. Biological crusts are scattered and few, though some spots had a higher occurrence, mainly in the form of mosses.

Degraded conditions were further observed while traveling toward the south boundary of the pasture. Evidence of pedestaling and flow patterns were found all around while erosion and sediment movement were associated with enlarged bare areas, and surface sealing and pedestals were common. Hoof shearing was continuous.

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☐ Meeting the Standard
☐ Not meeting the Standard, but making significant progress towards meeting
☒ Not meeting the Standard

Rationale for Evaluation Finding

Upland watershed Standard 1 in pasture 2 is not met. Observations during a field trip in the summer of 2012 (see project record) contradicted earlier monitoring results due to the presence of extensive pedestaling and connected water flow patterns. Livestock grazing during wet conditions has led to widespread mechanical soil damage and increased bare ground.

Although ground cover trend data in pasture 2 show a decline in bare ground, a decrease in durable soil cover, such as biological crusts, gravels, rocks, and persistent litter, is apparent along with no improvement in canopy cover. A significant spike in invasive annuals also warrants concern over the long term for pasture 1, which is meeting the Standard otherwise. The decreased ecological function and impaired soils indicate that soil and hydrologic function are compromised and that Standard 1 in the Madriaga allotment is not met.

Soda Creek Allotment

Setting

The Soda Creek allotment is located in Owyhee County, Idaho, approximately 7 miles northeast of Jordan Valley, Oregon, and approximately 3 miles west to northwest of De Lamar Mountain (see Map GEN-1). The allotment is now divided into eight pastures that include federal, state, and private lands totaling approximately 7,128 acres. Previous configurations show the newly identified pastures 6, 7, and 8 as being part of pasture 3 in the old schematics. Pastures 4 and 8 are 100 percent private.

The majorities of the soils in the allotment are shallow to moderately deep and well drained, are clayey to loamy, and vary in surface and subsurface rock fragments. These soils formed in residuum and alluvium that was derived predominantly from welded rhyolitic tuff along elevation ranges from 4,930 to 6,980 feet. The upland plant communities are dominated by mountain big sagebrush with an understory of Idaho fescue, bluebunch wheatgrass, bottlebrush squirreltail, and slender wheatgrass. Other vegetation types include pockets of Douglas fir at higher elevations, as well as Western juniper, quaking aspen, bitter cherry, and wyethia. A wildfire in 1962 burned the northern half of the allotment and the area was reseeded.

Rangeland Health Assessment

Pasture 1

Fire History: Two fires burned a total of 854 acres in 1962 and 2006, affecting 76 percent of the allotment in the eastern half (Map FIRE-3).

Rangeland Health Field Assessment: One RHFA was completed in 2003 on a Loamy 16+” inclusion within Loamy 13-16” ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). One hundred percent of the indicators are in the none-to-slight range of departure from reference site conditions (Table Soil-58). As a whole, pasture 1 has a none-to-slight degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-58).

Table Soil-58: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Soda Creek – pasture 1 from 2003 RHFA (Appendix SSR-1)

Soda Creek Pasture 1	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) n-s	20	100	0	0	0	0	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

There is little indication of soil erosion on this site, with all indicators rating as none-to-slight and near expected conditions. Water flow patterns show limited departure from reference conditions, with short and only occasionally connected well-covered flow paths that contain some non-distinct historic pedestals and very little bare ground. Some historic loss is evident but abundant organic matter, gravel, and plant cover provide resistance to erosion, and litter movement is uniformly distributed.

Although a moderate-to-extreme departure of invasive plants warrants concern, the plant community indicator, as it relates to hydrologic function and infiltration, shows a diverse vegetative community. The dominant visual aspect of the site is a mosaic of shrubs with an understory of a deep-rooted bunchgrass component and more shallow-rooted bunchgrasses. Despite a shift, the plant community transitions allow for the proper capture, storage, and management of moisture as compared to reference communities and soil stability and watershed function indicates a none-to-slight level.

Pasture 2

Fire History: One fire burned a total of 422 acres in 1962, affecting 67 percent of the allotment in all but the northeastern and southeastern corners (Map FIRE-3).

Rangeland Health Field Assessment: One RHFA was completed in 2003 on a Loamy 16+” ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Thirty-five percent of the indicators are in the none-to-slight range of departure from reference site conditions, 45 percent are in the slight-to-moderate range, and 20 percent are in the

moderate range (Table Soil-59). As a whole, pasture 1 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-59).

Table Soil-59: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Soda Creek – pasture 2 from 2003 RHFA's (Appendix SSR-1)

Soda Creek Pasture 2	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) s-m	7	35	9	45	4	20	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are present in the form of moderately rated water flow patterns that are of variable lengths, deeper than wide, and contain cut areas. Pedestalled plants are commonly associated with Sandberg bluegrass, display occasional exposed roots, and are also rated moderate. Terracettes are present and bare ground is small to moderate in size, primarily occurs on trails and in flow paths, and is sometimes connected.

Soil factors affecting the hydrologic function show a slight-to-moderate departure from reference conditions. Abundant rock, gravel, and organic matter help stabilize soils when present, while surface resistance to erosion and soil surface loss and degradation is increased in interspaces.

The plant community indicator, as it relates to hydrologic function, shows a slight-to-moderate degree of departure due to an increase in shrub component. A slight shift in deep-rooted bunchgrasses to shallow-rooted species is present, while invasive plants are on the increase and warrant concern. The plant community transitions still allow for the proper capture, storage, and management of moisture as compared to reference communities and soil stability and watershed function indicates a slight-to-moderate level of departure.

Pasture 3 (proposed Pastures 3, 6, 7 and 8)

Fire History: Two fires burned a total of 3,097 acres in 1962 and 2006, affecting 57 percent of the allotment in the western half (Map FIRE-3).

Rangeland Health Field Assessment: Six RHFA's were completed in 2003 but three were excluded because the sites were burned by the Chubby Spain fire in 2006 so that these previous assessments do not reflect the most recent conditions. The remaining three sites are located on a Loamy 13-16", a Loamy 13-16" inclusion within a Loamy 16+"; and a Mountain Shrub 18-22" inclusion within a Loamy 16+ ecological site (Appendix SSR-1; Maps ECOL-3 and RUGE-3). Fifty-seven percent of the indicators are in the none-to-slight range of departure from reference site conditions, 35 percent are in the slight-to-moderate range, and 8 percent are in the moderate range (Table Soil-60). As a whole, pasture 3 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-60). This pasture is proposed to be divided into pastures 3, 6, 7, and 8 in the EIS.

Table Soil-60: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Soda Creek – pasture 3 from 2003 RHFA's (Appendix SSR-1)

Soda Creek Pasture 3	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(3) s-m	34	57	21	35	5	8	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

Indicators of soil erosion are present in the form of water flow patterns that range from a slight-to-moderate to moderate departure from reference conditions for the three sites. Flow patterns are generally short, sometimes connected, have variable presence of cut areas, and are wider than deep. Where pedestaling is rated moderate, they are associated primarily with Sandberg bluegrass and located within the flow paths. Two sites show none-to-slight historic pedestaling and few terracettes. Bare ground is slightly higher than expected and rated slight-to-moderate at all sites and, when present, is associated with interspaces and livestock trails.

Soil factors affecting the hydrologic function consist of good organic matter and common rock and gravel aiding in stabilization. Soil surface loss and degradation and soil surface erosion are primarily slight-to-moderate or less with some historic removal and minor reduction in soil structure.

The plant community indicator as it relates to hydrologic function displays a primarily none-to-slight rating with little change in infiltration capacity. A shift in deep-rooted bunchgrasses to shallow-rooted species is present, while sites 04S05W14 and 04S05W13 display moderate-to-extreme and extreme ratings for invasive plants, with the latter site containing very little shrubs, a dominance of wyethia, and scattered grasses. While the biotic function is reduced and is cause for concern, soil and hydrologic indicators show that watershed function is maintained with a slight-to-moderate rating.

Emergency Stabilization Rehabilitation (ESR): A 2009 monitoring closeout summary report for the Chubby Spain fire (USDI BLM 2009) reflects on the recovery that has taken place after aerial seeding of some burned areas of Soda Creek and two neighboring allotments. The ESR report indicates fair to good canopy and basal cover that is successfully providing resistance to erosion. Few invasive species and a good diversity of perennial grasses, forbs, and shrubs are present and likely contribute to the substantial reduction in bare ground that has occurred since the fire. Sites appear to be recovering well and meeting the objectives of the ESR project. Though it will take more time for post-fire conditions to further improve, pasture 3 remains compatible with attainment of Standard 1.

Ground Cover Trend: Ground cover trend data were collected at one site in 2003, 2009, and 2012 (Table Soil-61; Map RNGE-3). Bare ground shows a non-significant decline, while non-persistent litter and persistent cover are primarily increasing. Canopy cover was static over the short term, with very little being present due to the fire, which is reflected in the significant decrease over the long term. Ground cover trend overall suggests slight improvements, though the majority of data are non-significant.

Table Soil-61: Ground cover data from trend site for Soda Creek – pasture 3

Soda Creek Pasture 3	Site 04S05W27	
	Short-term	Long-term
Bare Ground	D	D
Rock, gravel, biological crust & persistent litter	I^s	I
Non-persistent litter	D	I
Canopy Cover	S	D^s

I=Increase, D=Decrease, S=remains the same

^svalues are statistically significant

Pasture 4

The pasture is 100 percent private and has not been assessed.

Pasture 5

Fire History: Two fires burned a total of 1,143 acres in 1962 and 2006, affecting 92 percent of the pasture everywhere except for the southeastern corner (Map FIRE-3).

BLM land only makes up 9 percent of this pasture so that there are no RHFAs or ground cover trend data available for this pasture. There is not enough information to determine conditions.

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☒ Meeting the Standard
☐ Not meeting the Standard, but making significant progress towards meeting
☐ Not meeting the Standard

Rationale for Evaluation Finding

Watershed indicators show some departure from expected conditions for the ecological sites, though none were excessive enough to determine that Standard 1 would not be met. While water flow patterns and pedestals are elevated in pastures 2 and 3, there is little indication of accelerated sediment movement and the majority of the erosional features present appear to be related to historical events.

Plant communities of deep-rooted bunchgrasses are shifting to shallow-rooted species. Moderate-to-extreme and extreme ratings for invasive plants show a departure from reference conditions and appear not to be functioning at an adequate level in portions of pasture 3 and were identified as sources of concern regarding Standard 4. However, it appears that the majority rating was primarily based on whyethia, a native plant that is now dominating. While the

biotic function is reduced in localized areas, soil and hydrologic indicators show that watershed function still maintains proper nutrient and hydrologic cycling, and energy flow.

The impacts of the Chubby Spain fire in pasture 3 are reflected in ground cover trend, as canopy cover was removed and is still lacking. Slight improvements can be seen as bare ground appears to be decreasing and being stabilized by increases in litter and protective cover that aid in counteracting erosional processes. Similar observations were made in the ESR report and reflect recovery. Overall, Standard 1 for the Soda Creek allotment is met.

Trout Creek/Lequerica Allotment

Setting

The Trout Creek-Lequerica allotment is approximately 6 miles east of Jordan Valley, Oregon, in Owyhee County, Idaho (see Map GEN-1). The allotment is divided into two parcels, with pasture 1 containing West Fork Trout Creek and Nichols Creek, and pasture 2 being associated with Split Rock Canyon. The elevation of the allotment is between 4,700 and 5,600 feet. The major landforms in the area are categorized as foothills and mountains dominated by rhyolite tuffs and basalt flows. The soils are generally moderately deep to shallow, very stony loams with a slope of 5 to 50 percent, slight to high water erosion hazard rating, and a slight wind erosion hazard rating. Common plants include mountain big sagebrush, low sagebrush, bluebunch wheatgrass, Idaho fescue, and occasional western juniper.

Rangeland Health Assessment

Pasture 1

Fire History: One fire burned a total of 638 acres in 1962, affecting 63 percent of the allotment in the eastern two-thirds (Map FIRE-3).

Rangeland Health Field Assessment: One RHFA was completed in 2001 on a Loamy 13-16" ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). One-hundred percent of the indicators are in the none-to-slight range of departure from reference site conditions (Table Soil-62). As a whole, pasture 1 has a none-to-slight degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-62).

Table Soil-62: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Trout Creek/Lequerica – pasture 1 from 2001 RHFA (Appendix SSR-1)

Trout Creek/Lequerica Pasture 1	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) n-s	20	100	0	0	0	0	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

There is little indication of active soil erosion on this site, with all indicators rating as none-to-slight and near expected conditions. Water flow patterns show limited departure from reference conditions, primarily on side slopes, and very few pedestals are observed. Soil structure is slightly weaker in interspaces, but biological crust, gravel, plant cover, and rock are providing expected resistance to erosion, no soil loss is apparent on the site, and litter amount is uniformly distributed.

Although a moderate-to-extreme departure of invasive plants is noted, the plant community indicator, as it relates to hydrologic function and infiltration, shows an abundant deep-rooted bunchgrass component in interspaces and under canopies. The plant community transitions still allow for the proper capture, storage, and management of moisture as compared to reference communities and soil stability and watershed function indicates a none-to-slight level.

Ground Cover Trend: No ground cover trend data is available.

Pasture 2

Fire History: One fire burned a total of 124 acres in 1960, affecting 100 percent of the pasture (Map FIRE-3).

Rangeland Health Field Assessment: One RHFA was completed in 2001 on a Loamy Bottom 12-16" inclusion within a Dry Meadow ecological site (Appendix SSR-1; Maps ECOL-3 and RNGE-3). Sixty percent of the indicators are in the none-to-slight range of departure from reference site conditions, and 40 percent in the slight-to-

moderate range (Table Soil-63). As a whole, pasture 1 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table Soil-63).

Table Soil-63: Summary of watershed-related ratings of soil/site stability and hydrologic function indicators for Trout Creek/Lequerica – pasture 2 from 2001 RHFAs (Appendix SSR-1)

Trout Creek/Lequerica Pasture 2	Total RHFA Sites (#) & Overall Allotment Rating	Watershed Function									
		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%
Total Indicators	(1) s-m	12	60	8	40	0	0	0	0	0	0

n-s – slight-to-moderate; s-m – slight-to-moderate; m – moderate; m-e – moderate-to-extreme; e – extreme

There is little evidence of soil erosion on this site, as water flow patterns are not evident and historic pedestals are stabilized by microbotic soil crusts. Bare ground is rated slight-to-moderate and associated with some soil loss in interspaces that usually contain weaker soil structure.

Soil factors affecting the hydrologic function consist of soil crusts that help stabilize the surface. The plant community indicator, as it relates to hydrologic function, shows a slight-to-moderate degree of departure, with an imbalance of deep-rooted bunchgrasses to shallow-rooted species.

The shrub component was noted as too high, with many decadent broken shrubs and invasive plants, including juniper, common and scattered throughout the site. The plant community transitions still allow for the proper capture, storage, and management of moisture as compared to reference communities and watershed function is at a slight-to-moderate level.

Ground Cover Trend: No ground cover trend data is available.

Evaluation of Standard 1

Evaluation Finding – Allotment/watershed is:

- ☒ Meeting the Standard
☐ Not meeting the Standard, but making significant progress towards meeting
☐ Not meeting the Standard

Rationale for Evaluation Finding

Watershed indicators show very little departure from expected conditions for the ecological sites. Overall, the plant community and soil conditions on the Trout Creek/Lequerica allotment are adequate to provide for proper nutrient and hydrologic cycling, and energy flow. Overall, Standard 1 for the Trout Creek/Lequerica allotment is met.

5. Information Sources

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6. APPENDIX SSR-1 - Rangeland Health Assessment Summary Tables

ESD in GIS: Data other than “ok” reflects a discrepancy of ESDs between original field data sheet and what is displayed in the 2003 Owyhee Soil Survey. The soil map unit for the site was therefore checked and generally showed that the original call made is one of several ESDs possible for the specific soil map unit. Monitoring sites where the field data sheet displayed an ESD that could not be associated with the specific soil map unit are marked as “inclusion”.

Jump Creek Subroup

Table SSR-1: 2012 Indicator Ratings² for Rangeland Health Assessments for the Elephant Butte Allotment

ESD in GIS		ok	ok	ok	ok	ok	ok	ok
Indicator	Indicator Type ¹	051007-RH1A (1) 02N04W33 Sandy loam/ Calc Loam 7-10	051007- RH1B (1) 02N04W30 Calc 7-10	051007- RH2A (2) 01N04W05 Loamy 10-13	051707- RH3A (3) 01N04W10 Calc 7-10	051707- RH3B (3) 01N04W14 Calc 7-10 Loamy 10-13	051307- RH4A (4) 01N04W03 Calc 7-10	051707- RH5A (5) 02N04W22 Sandy Loam 8-12
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	n-s	n-s	m	n-s	s-m	n-s	n-s
3. Pedestals/Terracettes	S,H	n-s	n-s	m-e	n-s	n-s	n-s	n-s
4. Bare Ground	S,H	n-s	n-s	m	n-s	n-s	n-s	n-s
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	n-s	n-s	n-s	n-s	n-s	n-s	n-s
8. Soil Surface Resistance to Erosion	S,H,B	s-m	n-s	m	s-m	n-s	n-s	n-s
9. Soil Surface Loss or Degradation	S,H,B	s-m	n-s	m-e	n-s	s-m	n-s	n-s
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	m-e	m-e	m-e	m	m	m-e	m
11. Compaction Layer	S,H,B	n-s	n-s	s-m	n-s	n-s	n-s	s-m
12. Functional/Structural Groups	B	m-e	m-e	m	m-e	m	m-e	m-e
13. Plant Mortality/Decadence	B	n-s	n-s	m	n-s	n-s	s-m	n-s
14. Litter Amount	H,B	n-s	n-s	s-m	n-s	n-s	n-s	s-m
15. Annual Production	B	n-s	n-s	s-m	s-m	s-m	n-s	n-s
16. Invasive Plants	B	m-e	m-e	m	m-e	m-e	m-e	m-e
17. Reproductive Capability of Perennial Plants	B	n-s	n-s	n-s	m	n-s	n-s	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table SSR-2: 2012 Attribute Ratings for Rangeland Health Assessments for the Elephant Butte Allotment

Attribute	Attribute Rating						
	02N04W33	02N04W30	01N04W05	01N04W10	01N04W14	01N04W03	02N04W22
Soil/Site Stability (S)	n-s	n-s	m	n-s	n-s	n-s	n-s
Hydrologic Function (H)	n-s	n-s	m	n-s	s-m	n-s	n-s
Biotic Integrity (B)	m-e	m-e	m	m-e	m	m-e	m

Table SSR-3: 2012 Indicator Ratings² for Rangeland Health Assessments for the Poison Creek, Rats Nest, and Alkali-Wildcat Allotments

ESD in GIS		ok	ok	SCP 11-13	ok	ok	Loamy 10-13	ok
Indicator	Indicator Type ¹	Poison Ck. Seeding 061008-1B 01N05W05 Loamy 10-13	Poison Ck. Natural 061008-1A 01N05W05 Loamy 10-13	Rats Nest 052107-RH1A 01N04W33 Loamy 10-13	Rats Nest 052107-RH1B 01N04W22 Loamy 10-13	Alkali Wildcat 082107-RH1A 01N05W12 Loamy 10-13	Alkali Wildcat 082107-RH1B 01N05W15 Loamy 10-13 SCP 11-13	Alkali Wildcat 082107-RH1C 02N05W34 Loamy 10-13
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	s-m	n-s	n-s	n-s	s-m	n-s	n-s
3. Pedestals/Terracettes	S,H	s-m	m	m	n-s	m	m	m
4. Bare Ground	S,H	n-s	n-s	n-s	n-s	n-s	s-m	n-s
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	s-m	m	n-s	n-s	s-m	n-s	n-s
7. Litter Movement	S	n-s	n-s	n-s	n-s	m	s-m	n-s
8. Soil Surface Resistance to Erosion	S,H,B	s-m	s-m	n-s	n-s	m	n-s	s-m
9. Soil Surface Loss or Degradation	S,H,B	n-s	s-m	n-s	n-s	m	m	s-m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	n-s	n-s	s-m	n-s	n-s	s-m	n-s
11. Compaction Layer	S,H,B	n-s	n-s	n-s	n-s	n-s	n-s	n-s
12. Functional/Structural Groups	B	n-s	m	s-m	s-m	m	m	s-m
13. Plant Mortality/Decadence	B	n-s	s-m	n-s	n-s	n-s	m	n-s
14. Litter Amount	H,B	n-s	n-s	s-m	n-s	m	s-m	n-s
15. Annual Production	B	n-s	s-m	s-m	n-s	s-m	s-m	n-s
16. Invasive Plants	B	m	n-s	n-s	n-s	m	s-m	n-s
17. Reproductive Capability of Perennial Plants	B	n-s	n-s	n-s	n-s	s-m	s-m	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table SSR-4: 2012 Attribute Ratings for Rangeland Health Assessments for the Poison Creek, Rats Nest, and Alkali-Wildcat Allotments

Attribute	Attribute Rating						
	01N05W05	01N05W05	01N04W33	01N04W22	01N05W12	01N05W15	02N05W34
Soil/Site Stability (S)	n-s	s-m	n-s	n-s	m	s-m	s-m
Hydrologic Function (H)	n-s	s-m	n-s	n-s	m	s-m	n-s
Biotic Integrity (B)	n-s	s-m	n-s	n-s	m	s-m	n-s

Table SSR-5: 2012 Indicator Ratings² for Rangeland Health Assessments for the Sands Basin Allotment

ESD in GIS		ok	ok	ok	ok	ok	SCP 12-16
Indicator	Indicator Type ¹	091307-RH1A (1) 01N05W21 Loamy 11-13	082207-RH2A (2) 01N05W18 Loamy 10-13	082307-RH2B (2) 01N05W20 Loamy 11-13 SCP 12-16	082307-RH3A (3) 01N06W24 Loamy 10-13	082307-RH3B (3) 01N06W24 Loamy 10-13	090507-RH3C (3) 01N06W12 Loamy 11-13
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	s-m	n-s	n-s	s-m	n-s	n-s
3. Pedestals/Terracettes	S,H	m	s-m	s-m	s-m	s-m	n-s
4. Bare Ground	S,H	n-s	n-s	n-s	n-s	s-m	n-s
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	s-m	n-s	n-s	s-m	n-s	n-s
8. Soil Surface Resistance to Erosion	S,H,B	s-m	n-s	n-s	s-m	s-m	n-s
9. Soil Surface Loss or Degradation	S,H,B	m	n-s	n-s	s-m	s-m	n-s
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	n-s	n-s	n-s	m	m-e	s-m
11. Compaction Layer	S,H,B	n-s	n-s	n-s	n-s	n-s	n-s
12. Functional/Structural Groups	B	s-m	n-s	n-s	m-e	e	s-m
13. Plant Mortality/Decadence	B	s-m	s-m	n-s	n-s	s-m	n-s
14. Litter Amount	H,B	n-s	n-s	n-s	m	e	s-m
15. Annual Production	B	n-s	s-m	n-s	m	n-s	n-s
16. Invasive Plants	B	m	s-m	n-s	m-e	e	s-m
17. Reproductive Capability of Perennial Plants	B	s-m	n-s	n-s	s-m	m	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table SSR-6: 2012 Attribute Ratings for Rangeland Health Assessments for the Sands Basin Allotment

Attribute	Attribute Rating					
	01N05W21	01N05W18	01N05W20	01N06W24	01N06W24	01N06W12
Soil/Site Stability (S)	s-m	n-s	n-s	s-m	s-m	n-s
Hydrologic Function (H)	s-m	n-s	n-s	s-m	m	n-s
Biotic Integrity (B)	s-m	n-s	n-s	m	m-e	n-s

Table SSR-7: 2012 Indicator Ratings² for Rangeland Health Assessments for the Sands Basin Allotment (cont.)

ESD in GIS		ok	Loamy 11-13 MU89	SCP 12-16
Indicator	Indicator Type¹	082207-RH4A (4) 01N05W31 Loamy 11-13 (w/ SCP 11-13 inclusions)	091307-RH4C (4) 01N05W28 SCP 11-13 (inclusion)	090507-RH4B (4) 01N06W26 Loamy 11-13 SCP 12-16
1. Rills	S,H	n-s	n-s	n-s
2. Water Flow Patterns	S,H	n-s	m	m-e
3. Pedestals/Terracettes	S,H	m-e	m	m
4. Bare Ground	S,H	n-s	n-s	s-m
5. Gullies	S,H	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s
7. Litter Movement	S	s-m	s-m	s-m
8. Soil Surface Resistance to Erosion	S,H,B	n-s	m	s-m
9. Soil Surface Loss or Degradation	S,H,B	s-m	m	m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	s-m	s-m	m-e
11. Compaction Layer	S,H,B	n-s	n-s	n-s
12. Functional/Structural Groups	B	m	s-m	m-e
13. Plant Mortality/Decadence	B	m-e	m-e	n-s
14. Litter Amount	H,B	n-s	m	s-m
15. Annual Production	B	n-s	s-m	s-m
16. Invasive Plants	B	m-e	m-e	m-e
17. Reproductive Capability of Perennial Plants	B	s-m	s-m	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table SSR-8: 2012 Attribute Ratings for Rangeland Health Assessments for the Sands Basin Allotment (cont.)

Attribute	Attribute Rating		
	01N05W31	01N05W28	01N06W26
Soil/Site Stability (S)	s-m	m	m
Hydrologic Function (H)	s-m	m	m
Biotic Integrity (B)	m	m	m

Succor Creek Subgroup

Table SSR-9: 2012 Indicator Ratings² for Rangeland Health Assessments for the Blackstock Springs Allotment

ESD in GIS		ok	ok	SCP 12-16 MU151	ok	SCP 11-13	ok
Indicator	Indicator Type¹	(1) 061703-1A 01S05W29 Loamy 10-13	(1) 061703-3A 01S05W21 Loamy 10-13	(1) 061703-4A 01S05W27 Loamy 13-16 (inclusion)	(1) 061703-5A 01S05W9 Loamy 10-13	(1) 061803-1A 01S05W30 Loamy 10-13	(2) 060503-1A 02S05W04 SCP 11-13
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	m	m	s-m	m	m	s-m
3. Pedestals/Terracettes	S,H	m	s-m	s-m	s-m	s-m	m
4. Bare Ground	S,H	s-m	s-m	n-s	s-m	s-m	s-m
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	n-s	n-s	n-s	s-m	s-m	s-m
8. Soil Surface Resistance to Erosion	S,H,B	s-m	s-m	n-s	s-m	s-m	s-m
9. Soil Surface Loss or Degradation	S,H,B	s-m	n-s	n-s	s-m	s-m	s-m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	s-m	s-m	m	m	n-s	s-m
11. Compaction Layer	S,H,B	n-s	n-s	n-s	n-s	n-s	s-m
12. Functional/Structural Groups	B	s-m	s-m	s-m	s-m	s-m	s-m
13. Plant Mortality/Decadence	B	m	n-s	n-s	s-m	m	s-m
14. Litter Amount	H,B	s-m	s-m	n-s	m	s-m	s-m
15. Annual Production	B	n-s	n-s	n-s	m	n-s	n-s
16. Invasive Plants	B	m-e	m-e	m-e	m-e	m-e	s-m
17. Reproductive Capability of Perennial Plants	B	n-s	n-s	n-s	s-m	n-s	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table SSR-10: 2012 Attribute Ratings for Rangeland Health Assessments for the Blackstock Springs Allotment

Attribute	Attribute Rating					
	01S05W29	01S05W21	01S05W27	01S05W9	01S05W30	02S05W04
Soil/Site Stability (S)	s-m	s-m	s-m	s-m	s-m	s-m
Hydrologic Function (H)	s-m	s-m	s-m	s-m	s-m	s-m
Biotic Integrity (B)	s-m	s-m	s-m	s-m	s-m	s-m

Table SSR-11: 2012 Indicator Ratings² for Rangeland Health Assessments for the Blackstock Springs Allotment (cont.)

ESDs in GIS		ok	SCP 12-16 MU166	SCP 12-16 MU151	SCP 12-16 MU151	SCP 12-16 MU151	SCP 12-16 MU192	SCP 12-16 MU192
Indicator	Indicator Type ¹	(2) 061803-2A 02S05W11 SCP 12-16	(2) 060503-2A 02S05W09 Loamy 11-13 (inclusion)	(2) 061703-3A 01S05W34 SCP 12-16 Loamy 13-16 (inclusion)	(3) 061803-3A 02S05W14 Loamy 13-16 (inclusion)	(3) 061803-4A 02S05W22 Loamy 16+ (inclusion)	(3) 070903-1A 02S05W21 Loamy 16+ (inclusion)	(3) 061903-1A 02S05W21 Loamy 16+ (inclusion)
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	m-e	s-m	m-e	m-e	s-m	s-m	n-s
3. Pedestals/Terracettes	S,H	m-e	n-s	m	m-e	n-s	s-m	n-s
4. Bare Ground	S,H	s-m	m	s-m	s-m	n-s	n-s	n-s
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	s-m	s-m	s-m	s-m	n-s	n-s	n-s
8. Soil Surface Resistance to Erosion	S,H,B	s-m	s-m	s-m	s-m	n-s	n-s	n-s
9. Soil Surface Loss or Degradation	S,H,B	s-m	s-m	s-m	s-m	n-s	n-s	n-s
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	s-m	s-m	s-m	n-s	s-m	n-s	n-s
11. Compaction Layer	S,H,B	n-s	n-s	n-s	n-s	n-s	n-s	n-s
12. Functional/Structural Groups	B	s-m	s-m	s-m	s-m	s-m	n-s	n-s
13. Plant Mortality/Decadence	B	m	s-m	s-m	s-m	n-s	n-s	n-s
14. Litter Amount	H,B	s-m	s-m	s-m	s-m	n-s	n-s	n-s
15. Annual Production	B	n-s	n-s	n-s	n-s	n-s	n-s	n-s
16. Invasive Plants	B	m	m-e	m-e	m-e	m-e	s-m	n-s
17. Reproductive Capability of Perennial Plants	B	s-m	s-m	n-s	n-s	n-s	n-s	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table SSR-12: 2012 Attribute Ratings for Rangeland Health Assessments for the Blackstock Springs Allotment (cont.)

Attribute	Attribute Rating						
	02S05W11	02S05W09	01S05W34	02S05W14	02S05W22	02S05W21	02S05W21
Soil/Site Stability (S)	m	n-s (<i>s-m</i>)	s-m	s-m	n-s	n-s	n-s
Hydrologic Function (H)	m	s-m	s-m	s-m (<i>m</i>)	n-s	n-s	n-s
Biotic Integrity (B)	s-m	s-m	s-m	s-m	n-s	n-s	n-s

Letters in italics display final ratings determined during the interdisciplinary team revision in 2012 where the original call from 2003 was changed based on all available information.

Table SSR-13: 2012 Indicator Ratings² for Rangeland Health Assessments for the Jackson Creek Allotment

ESDs in GIS*		SCP 12-16	SCP 12-16	Loamy 16+ MU92	ok	ok	SCP 11-13 MU16
Indicator	Indicator Type ¹	070803-2A (1) RH1A 03S06W25 SCP 11-13	070803-3A (1) RH1B 03S05W30 SCP 11-13	072903-4A (4) 03S05W27 SCP 12-16 (inclusion)	072903-3A (4) 03S05W35 Loamy 16+	071503-1A (2) RH2A 03S05W21 SCP 11-13	071803-1A (3) RH3A 02S05W32 SCP 12-16 (inclusion)
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	m-e	m	s-m	m-e	n-s	m
3. Pedestals/Terracettes	S,H	m-e	s-m	s-m	m	n-s	m-e
4. Bare Ground	S,H	s-m	n-s	n-s	s-m	n-s	m
5. Gullies	S,H	n-s	n-s	n-s	s-m	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	n-s	n-s	n-s	s-m	n-s	s-m
8. Soil Surface to Erosion	S,H,B	s-m	n-s	n-s	s-m	n-s	m
9. Soil Surface Loss or Degradation	S,H,B	m	s-m	n-s	s-m	n-s	s-m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	s-m	m	n-s	m	n-s	s-m
11. Compaction Layer	S,H,B	n-s	m	n-s	n-s	n-s	n-s
12. Functional/Structural Groups	B	s-m	m	s-m	m	n-s	s-m
13. Plant Mortality/Decadence	B	s-m	n-s	s-m	s-m	n-s	s-m
14. Litter Amount	H,B	n-s	n-s	n-s	s-m	n-s	s-m
15. Annual Production	B	n-s	s-m	n-s	n-s	n-s	n-s
16. Invasive Plants	B	m-e	m-e	m	m-e	m	s-m
17. Reproductive Capability of Perennial Plants	B	n-s	m	s-m	s-m	n-s	s-m

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table SSR-14: 2012 Attribute Ratings for Rangeland Health Assessments for the Jackson Creek Allotment

Attribute	Attribute Rating					
	03S06W25	03S05W30	03S05W27	03S05W35	03S05W21	02S05W32
Soil/Site Stability (S)	m	s-m	n-s	m	n-s	m
Hydrologic Function (H)	m	s-m	n-s	m	n-s	m
Biotic Integrity (B)	m	s-m	s-m	m	n-s	s-m

Table SSR-15: 2012 Indicator Ratings² for Rangeland Health Assessments for the Jackson Creek Allotment (cont.)

ESDs in GIS		ok	Loamy 16+ MU92	ok	ok	ok
Indicator	Indicator Type ¹	061903-2A (3) RH3B 02S05W29 SCP 12-16	072903-2A (4) RH4A 03S05W34 SCP 12-16 (inclusion)	081903-1A (4) RH4B 03S05W35 Loamy 16+	081903-2A (4) RH4C 03S05W27 SCP 12-16	080503-4A (5) RH5A 04S04W8 Loamy 16+
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	n-s	m	m	m	s-m
3. Pedestals/Terracettes	S,H	n-s	s-m	m	s-m	s-m
4. Bare Ground	S,H	s-m	s-m	s-m	n-s	n-s
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	n-s	s-m	n-s	s-m	n-s
8. Soil Surface to Erosion	S,H,B	n-s	s-m	s-m	n-s	n-s
9. Soil Surface Loss or Degradation	S,H,B	n-s	s-m	s-m	s-m	n-s
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	n-s	m	s-m	n-s	s-m
11. Compaction Layer	S,H,B	n-s	n-s	n-s	n-s	n-s
12. Functional/Structural Groups	B	s-m	s-m	s-m	s-m	s-m
13. Plant Mortality/Decadence	B	n-s	n-s	s-m	s-m	n-s
14. Litter Amount	H,B	n-s	n-s	m	s-m	s-m
15. Annual Production	B	n-s	n-s	s-m	n-s	n-s
16. Invasive Plants	B	m-e	m-e	m	s-m	m
17. Reproductive Capability of Perennial Plants	B	s-m	s-m	m	s-m	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table SSR-16: 2012 Attribute Ratings for Rangeland Health Assessments for the Jackson Creek Allotment (cont.)

Attribute	Attribute Rating				
	02S05W29	03S05W34	03S05W35	03S05W27	04S04W8
Soil/Site Stability (S)	n-s	s-m	s-m	n-s	n-s
Hydrologic Function (H)	n-s	s-m	m	n-s	n-s
Biotic Integrity (B)	s-m	s-m	s-m	s-m	s-m

Cow Creek Subgroup

Table SSR-17: 2012 Indicator Ratings² for Rangeland Health Assessments for the Burgess FFR and Burgess, Lowry FFR, and Texas Basin FFR Allotments

EDSs in GIS		SCP 12-16	SCP 12-16	SCP 11-13 MU166	SCP 11-13 MU166	ok	SCP 11-13 MU16
Indicator	Indicator Type ¹	Burgess FFR 081903-3A (2) 03S06W25 SCP 11-13	Burgess FFR 071603-2A (2) 03S06W26 SCP 11-13	Burgess 071603-3A (1) 03S06W26 Loamy 13-16 (inclusion)	Burgess 071603-1A (3) 04S06W02 Loamy 13-16 (inclusion)	Lowry FFR ³ 102901-1A (1) 05S06W24 SCP 12-16	Texas Basin FFR 061603-3A (2) 02S05W29 SCP 12-16 (inclusion)
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	s-m	m	s-m	m	s-m	m
3. Pedestals/Terracettes	S,H	m-e	m-e	s-m	m	m	m
4. Bare Ground	S,H	n-s	m-e	n-s	n-s	s-m	n-s
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	n-s	s-m	n-s	n-s	n-s	s-m
8. Soil Surface Resistance to Erosion	S,H,B	n-s	m	s-m	s-m	m	n-s
9. Soil Surface Loss or Degradation	S,H,B	m	m	s-m	s-m	m	s-m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	s-m	m	n-s	s-m	s-m	m
11. Compaction Layer	S,H,B	n-s	n-s	n-s	n-s	s-m	n-s
12. Functional/Structural Groups	B	m-e	m-e	s-m	s-m	m	m
13. Plant Mortality/Decadence	B	s-m	m	n-s	s-m	s-m	m-e
14. Litter Amount	H,B	m	s-m	n-s	n-s	s-m	m
15. Annual Production	B	n-s	s-m	n-s	n-s	n-s	s-m
16. Invasive Plants	B	e	m	m	m	s-m	m-e
17. Reproductive Capability of Perennial Plants	B	m	s-m	n-s	m	n-s	m

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

³This RHA now falls within pasture 2 of the Cow Creek allotment since fence lines were corrected (in GIS) in August 2012

Table SSR-18: 2012 Attribute Ratings for Rangeland Health Assessments for Burgess FFR and Burgess, Lowry FFR, and Texas Basin FFR Allotments

Attribute	Attribute Rating					
	03S06W25	05S06W26	03S06W26	04S06W02	05S06W24	02S05W29
Soil/Site Stability (S)	s-m	m	n-s	s-m	s-m	s-m
Hydrologic Function (H)	s-m	m	n-s	s-m	s-m	s-m
Biotic Integrity (B)	m (<i>m-e</i>)	m	s-m	s-m	s-m	m

Letters in *italics* display final ratings determined during the interdisciplinary team revision in 2012 where the original call from 2003 was changed based on all available information.

Table SSR-19: 2012 Indicator Ratings² for Rangeland Health Assessments for the Cow Creek Allotment

ESDs in GIS		SCP 12-16	Loamy 11-13 MU197	ok	ok	ok	ok	Loamy 13-16	ok
Indicator	Indicator Type ¹	051601-3A (1) 05S06W26 Loamy 11-13	051401-3A (2) 05S06W11 Loamy 13-16 (inclusion)	051401-2A (2) 05S06W11 SCP 11-13	052401-3A (2) 05S06W24 SCP 12-16	051701-4A (3) 04S05W31 Loamy 13-16	051701-3A (4) 05S05W6 Loamy 13-16	051701-1A (5) 05S05W3 SCP 12-16	051701-2A (5) 05S05W3 Loamy 13-16
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	s-m	s-m	s-m	n-s	s-m	s-m	m-e	n-s
3. Pedestals/Terracettes	S,H	s-m	s-m	s-m	n-s	n-s	n-s	m	s-m
4. Bare Ground	S,H	n-s	s-m	n-s	n-s	n-s	s-m	s-m	n-s
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	n-s	n-s	n-s	n-s	n-s	n-s	n-s	n-s
8. Soil Surface Resistance to Erosion	S,H,B	n-s	s-m	n-s	s-m	n-s	n-s	m	n-s
9. Soil Surface Loss or Degradation	S,H,B	s-m	s-m	s-m	n-s	n-s	n-s	s-m	n-s
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	s-m	s-m	n-s	n-s	n-s	s-m	n-s	s-m
11. Compaction Layer	S,H,B	n-s	n-s	n-s	n-s	n-s	n-s	n-s	n-s
12. Functional/Structural Groups	B	s-m	m	s-m	m	s-m	m	s-m	m
13. Plant Mortality/Decadence	B	n-s	s-m	n-s	n-s	n-s	n-s	n-s	s-m
14. Litter Amount	H,B	n-s	n-s	n-s	s-m	n-s	n-s	n-s	n-s
15. Annual Production	B	n-s	n-s	n-s	n-s	n-s	n-s	n-s	n-s
16. Invasive Plants	B	m	s-m	s-m	m-e	n-s	s-m	m	m
17. Reproductive Capability of Perennial Plants	B	n-s	n-s	n-s	n-s	n-s	n-s	n-s	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table SSR-20: 2012 Attribute Ratings for Rangeland Health Assessments for the Cow Creek Allotment

Attribute	Attribute Rating							
	05S06W26	05S06W11	05S06W11	05S06W24	04S05W31	05S05W6	05S05W3	05S05W3
Soil/Site Stability (S)	n-s	s-m	n-s	n-s	n-s	n-s	m	n-s
Hydrologic Function (H)	s-m	s-m	n-s	n-s	n-s	s-m	s-m	n-s
Biotic Integrity (B)	n-s	s-m	n-s	s-m	n-s	s-m	n-s	s-m

Table SSR-21: 2012 Indicator Ratings² for Rangeland Health Assessments for the Madriaga Allotment

ESDs in GIS		SCP 11-13 MU16	ok	ok	Loamy 16+ MU92	ok	ok	SCP 12-16
Indicator	Indicator Type¹	071703-3A (1) RH-1A 03S05W32 Loamy 12-16 (inclusion)	071703-2A (1) RH-1B 04S05W04 SCP 11-13	071703-1A (1) RH-1C 03S05W33 SCP 11-13	072903-1A (1) RH-1D 04S05W03 SCP 12-16 (inclusion)	072103-2A (2) RH-2A 04S06W11 SCP 11-13	072103-1A (2) RH-2B 04S06W11 SCP 12-16	072103-3A (2) RH-2C 04S06W11 Loamy 12-16
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	s-m	s-m	m	n-s	m-e	s-m	s-m
3. Pedestals/Terracettes	S,H	s-m	m	s-m	s-m	m-e	s-m	s-m
4. Bare Ground	S,H	s-m	n-s	s-m	n-s	s-m	n-s	n-s
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	n-s	n-s	n-s	n-s	s-m	n-s	n-s
8. Soil Surface Resistance to Erosion	S,H,B	s-m	s-m	n-s	n-s	s-m	s-m	n-s
9. Soil Surface Loss or Degradation	S,H,B	s-m	s-m	s-m	s-m	s-m	s-m	s-m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	s-m	s-m	s-m	n-s	s-m	s-m	n-s
11. Compaction Layer	S,H,B	n-s	n-s	n-s	n-s	n-s	n-s	n-s
12. Functional/Structural Groups	B	s-m	m	m	n-s	s-m	s-m	s-m
13. Plant Mortality/Decadence	B	n-s	n-s	s-m	n-s	s-m	s-m	s-m
14. Litter Amount	H,B	s-m	s-m	s-m	n-s	s-m	n-s	n-s
15. Annual Production	B	n-s	s-m	n-s	n-s	n-s	n-s	n-s
16. Invasive Plants	B	m-e	m	m	s-m	s-m	m	s-m
17. Reproductive Capability of Perennial Plants	B	m-e	s-m	s-m	s-m	s-m	s-m	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table SSR-22: 2012 Attribute Ratings for Rangeland Health Assessments for the Madriaga Allotment

Attribute	Attribute Rating						
	03S05W32	04S05W04	03S05W33	04S05W03	04S06W11	04S06W11	04S06W11
Soil/Site Stability (S)	s-m	s-m	s-m	n-s	s-m	s-m	n-s
Hydrologic Function (H)	s-m	s-m	s-m	n-s	m	s-m	n-s
Biotic Integrity (B)	s-m	m	s-m	n-s	s-m	s-m	n-s

Table SSR-23: 2012 Indicator Ratings² for Rangeland Health Assessments for the Trout Creek/Lequerica, Chimney Pot, and Ferris FFR Allotments

ESDs in GIS		ok	Dry Meadow MU183	ok	SCP 11-13 MU16	SCP 12-16 MU166	ok
Indicator	Indicator Type¹	Trout Ck./Lequerica 052401-1A (1) 05S05W05 Loamy 13-16	Trout Ck./Lequerica 052401-2A (2) 05S05W18 Loamy Bottom 12-16	Chimney Pot FFR 101801-1A 04S05W32 Loamy 13-16	Ferris FFR 081803-2A (1) 04S05W09 SCP 12-16 (inclusion)	Ferris FFR 081803-1A (2) 04S06W12 Loamy 11-13 (inclusion)	Ferris FFR 081303-1A (3) 04S05W19 Loamy 13-16
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	n-s	n-s	n-s	m	s-m	m
3. Pedestals/Terracettes	S,H	n-s	n-s	n-s	s-m	s-m	s-m
4. Bare Ground	S,H	n-s	s-m	n-s	n-s	n-s	s-m
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	n-s	n-s	n-s	n-s	n-s	n-s
8. Soil Surface Resistance to Erosion	S,H,B	n-s	s-m	n-s	n-s	n-s	n-s
9. Soil Surface Loss or Degradation	S,H,B	n-s	s-m	n-s	s-m	s-m	s-m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	n-s	s-m	n-s	s-m	n-s	s-m
11. Compaction Layer	S,H,B	n-s	n-s	n-s	n-s	n-s	n-s
12. Functional/Structural Groups	B	s-m	m	n-s	s-m	s-m	m-e
13. Plant Mortality/Decadence	B	n-s	m	n-s	s-m	n-s	n-s
14. Litter Amount	H,B	n-s	s-m	n-s	s-m	n-s	s-m
15. Annual Production	B	n-s	n-s	n-s	n-s	n-s	n-s
16. Invasive Plants	B	m-e	m	s-m	m-e	m	m-e
17. Reproductive Capability of Perennial Plants	B	n-s	n-s	n-s	s-m	n-s	m

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table SSR-24: 2012 Attribute Ratings for Rangeland Health Assessments for the Trout Creek/Lequerica, Chimney Pot FFR, and Ferris FFR Allotments

Attribute	Attribute Rating					
	05S05W05	05S05W18	04S05W32	04S05W09	04S06W12	04S05W19
Soil/Site Stability (S)	n-s	s-m	n-s	s-m	n-s	s-m
Hydrologic Function (H)	n-s	s-m	n-s	s-m	n-s	s-m
Biotic Integrity (B)	s-m	s-m	n-s	m	n-s	m

Table SSR-25: 2012 Indicator Ratings² for Rangeland Health Assessments for the Joint Allotment

ESDs in GIS		SCP 11-13	SCP 11-13	SCP 11-13	ok	SCP 11-13	SCP 12-16 MU166	ok
Indicator	Indicator Type1	081803-4A (5) 04S05W06 Loamy 12-16	071503-3A (2) 04S06W14 Loamy 13-16	081103-1A (2) 04S05W18 Loamy 13-16	081103-2A (3) 04S06W12 SCP 12-16	081803-3A (3) 04S05W07 Loamy 13-16	073003-2A (3) 04S05W09 Loamy 13-16 (inclusion)	081203-2A (4) 04S05W22 Loamy 13-16*
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	m	m	m-e	m-e	m-e	s-m	m
3. Pedestals/Terracettes	S,H	n-s	m-e	m	m	m	s-m	m
4. Bare Ground	S,H	n-s	s-m	m	n-s	m	m	s-m
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	n-s	s-m	s-m	n-s	s-m	s-m	n-s
8. Soil Surface Resistance to Erosion	S,H,B	s-m	s-m	s-m	s-m	m	m	s-m
9. Soil Surface Loss or Degradation	S,H,B	s-m	m	s-m	m	m	m	s-m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	m	m	s-m	m	m	s-m	s-m
11. Compaction Layer	S,H,B	n-s	n-s	n-s	n-s	n-s	s-m	n-s
12. Functional/Structural Groups	B	m-e	s-m	s-m	m	s-m	s-m	s-m
13. Plant Mortality/Decadence	B	s-m	m	n-s	s-m	m	s-m	s-m
14. Litter Amount	H,B	n-s	s-m	s-m	n-s	m-e	m	m
15. Annual Production	B	n-s	n-s	n-s	n-s	s-m	n-s	n-s
16. Invasive Plants	B	e	s-m	m-e	m-e	s-m	n-s	m
17. Reproductive Capability of Perennial Plants	B	s-m	n-s	n-s	m	s-m	n-s	m

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

*site is excluded from evaluation since it was burned in 2006 Chubby Spain fire.

Table SSR-26: 2012 Attribute Ratings for Rangeland Health Assessments for the Joint Allotment

Attribute	Attribute Rating						
	04S05W06	04S05W06	04S05W18	04S06W12	04S05W07	04S05W09	04S05W22
Soil/Site Stability (S)	s-m	m	s-m	m	m	m	s-m
Hydrologic Function (H)	s-m	m	m	m	m	m	s-m
Biotic Integrity (B)	m	s-m	s-m	m	m	m	m

Table SSR-27: 2012 Indicator Ratings² for Rangeland Health Assessments for the Soda Creek Allotment

ESDs in GIS		Loamy 13-16	Loamy 13-16	ok	ok	Loamy 16+	ok	ok	Loamy 16+ MU122
Indicator	Indicator Type	080503-1A (3) 04S05W27 SCP 11-13* (inclusion)	080703-1A (1) 04S05W35 Loamy 16+	081203-1A (3) 04S05W22 Loamy 13-16*	080603-1A (2) 04S05W12 Loamy 16+	080603-2A (3) 04S05W14 Loamy 13-16	080603-3A (3) 04S05W13 Loamy 13-16	080503-2A (3) 04S05W24 Loamy 13-16*	080503-3A (3) 04S04W18 Mountain brush 18-22 (inclusion)
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	m	n-s	m-e	m	m	s-m	s-m	s-m
3. Pedestals/Terracettes	S,H	s-m	n-s	m	m	m	n-s	n-s	n-s
4. Bare Ground	S,H	s-m	n-s	n-s	s-m	s-m	s-m	n-s	s-m
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	n-s	n-s	n-s	s-m	n-s	n-s	n-s	n-s
8. Soil Surface Resistance to Erosion	S,H,B	n-s	n-s	n-s	s-m	s-m	n-s	n-s	s-m
9. Soil Surface Loss or Degradation	S,H,B	s-m	n-s	s-m	s-m	s-m	n-s	n-s	s-m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	s-m	n-s	n-s	s-m	s-m	n-s	n-s	n-s
11. Compaction Layer	S,H,B	n-s	n-s	n-s	n-s	n-s	n-s	n-s	n-s
12. Functional/Structural Groups	B	s-m	s-m	s-m	s-m	s-m	m	s-m	s-m
13. Plant Mortality/Decadence	B	n-s	n-s	s-m	n-s	n-s	n-s	s-m	n-s
14. Litter Amount	H,B	n-s	n-s	n-s	s-m	s-m	m	s-m	s-m
15. Annual Production	B	n-s	n-s	n-s	n-s	n-s	n-s	n-s	n-s
16. Invasive Plants	B	m	m-e	m-e	m-e	m-e	e	s-m	s-m
17. Reproductive Capability of Perennial Plants	B	n-s	s-m	n-s	s-m	s-m	s-m	s-m	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

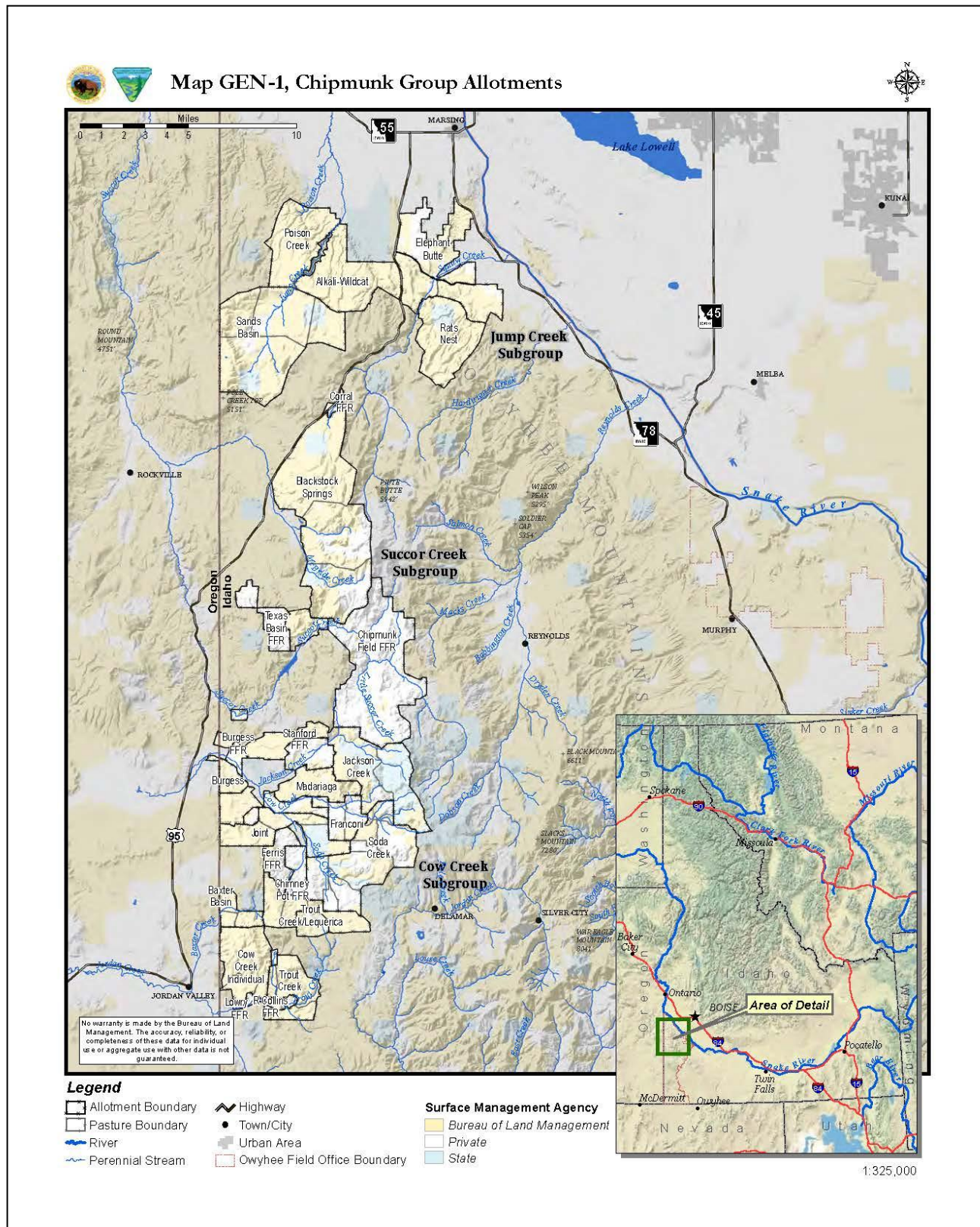
*site is excluded from evaluation since it was burned in 2006 Chubby Spain fire.

Table SSR-28: 2012 Attribute Ratings for Rangeland Health Assessments for the Soda Creek Allotment

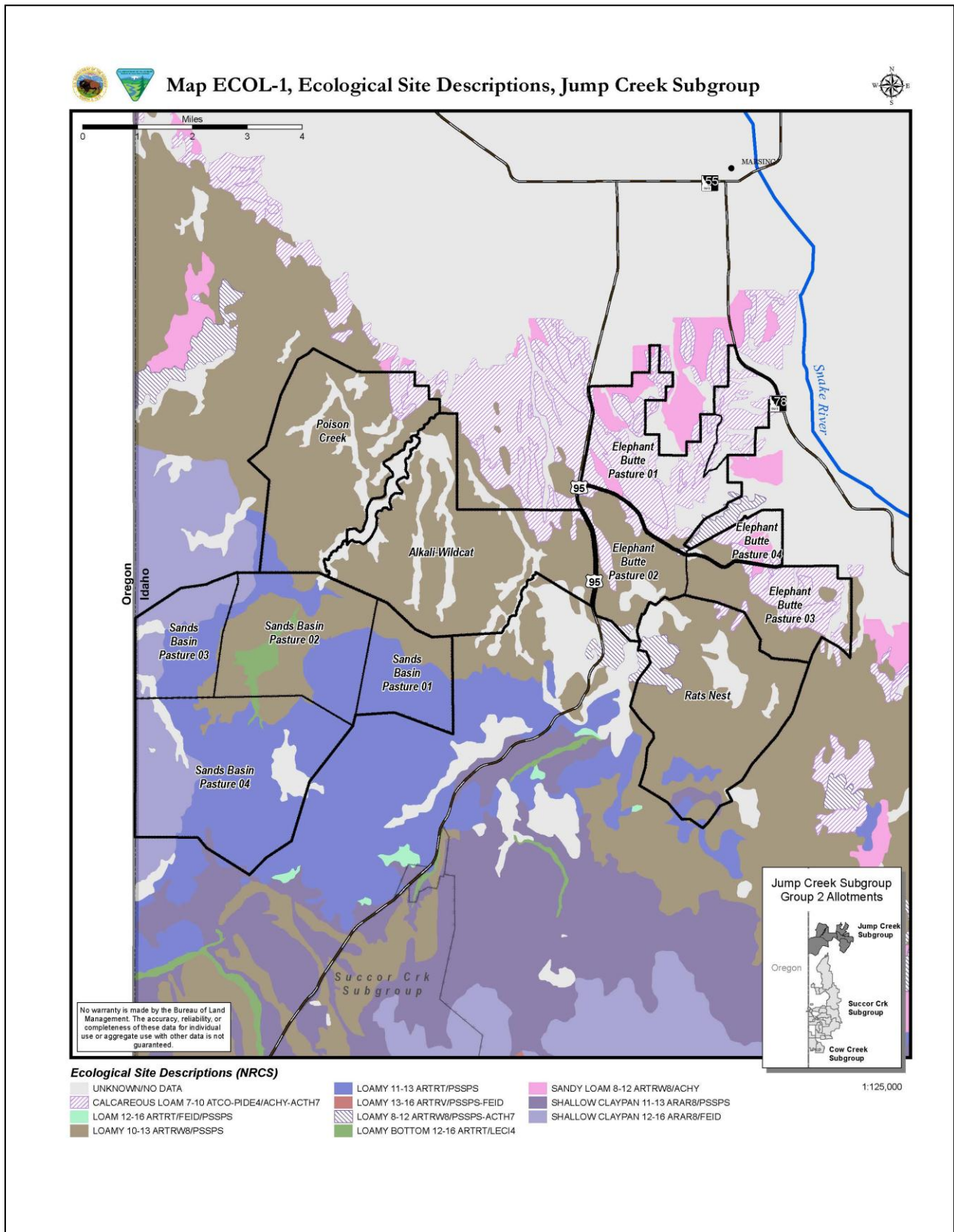
Attribute	Attribute Rating							
	04S05W27	04S05W35	04S05W22	04S05W12	04S05W14	04S05W13	04S05W24	04S04W18
Soil/Site Stability (S)	s-m	n-s	s-m	s-m	s-m	s-m	n-s	s-m
Hydrologic Function (H)	s-m	n-s	s-m	s-m	s-m	s-m	n-s	s-m
Biotic Integrity (B)	s-m	s-m	s-m	s-m	m	m-e	s-m	s-m

7. APPENDIX SSR-2 - Maps

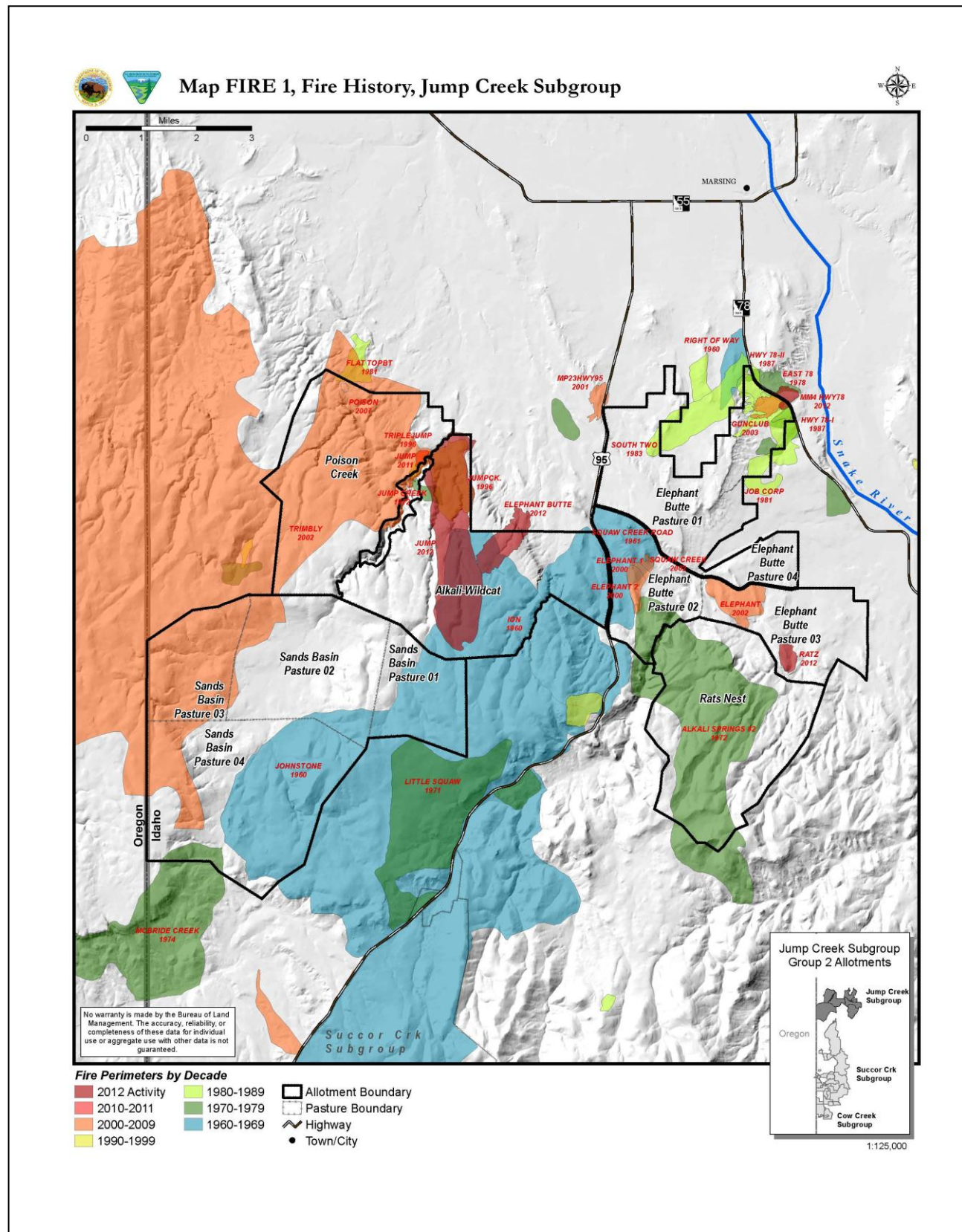
Map Gen-1: Chipmunk Group Allotments



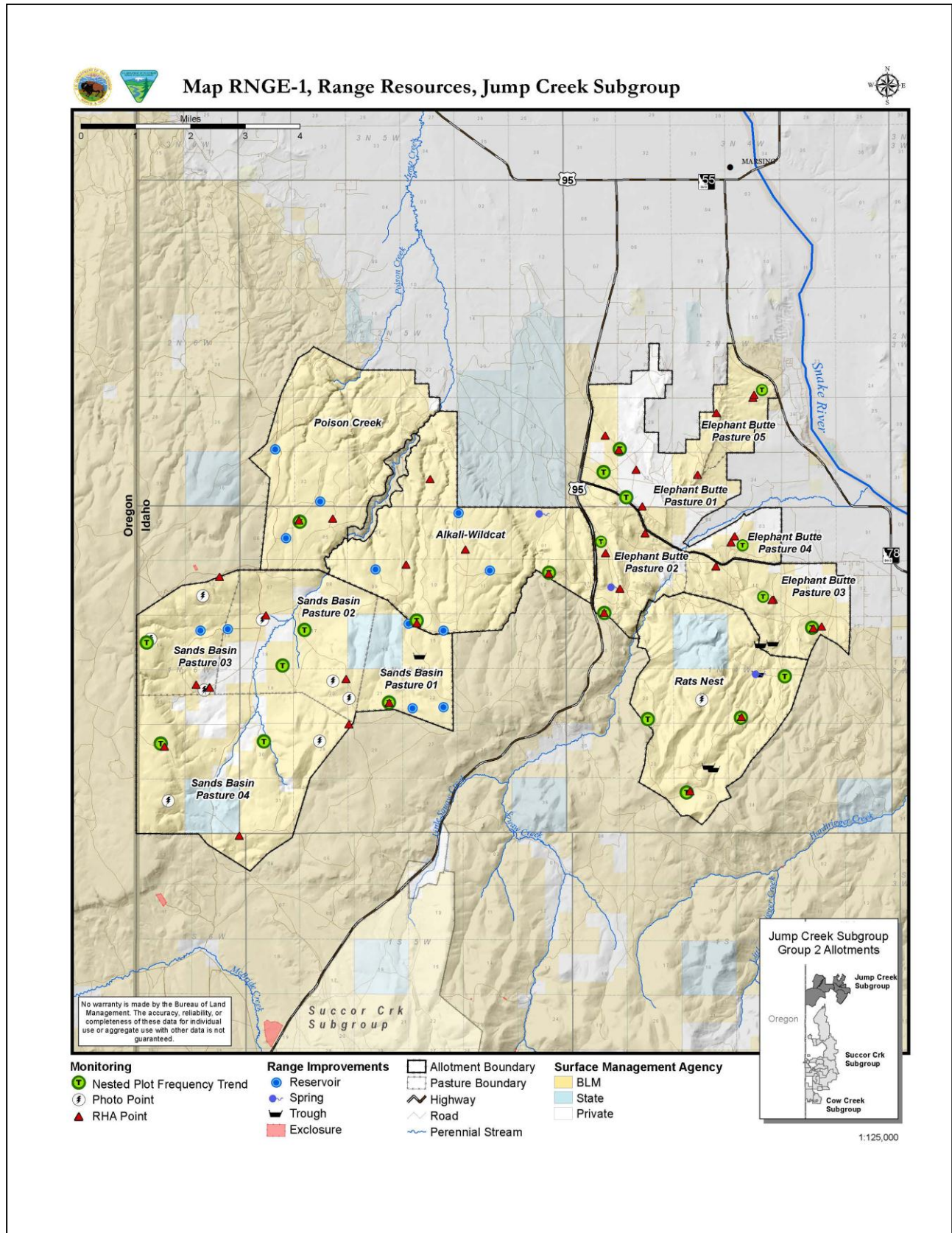
Map ECOL-1: Ecological Site Descriptions, Jump Creek Subgroup



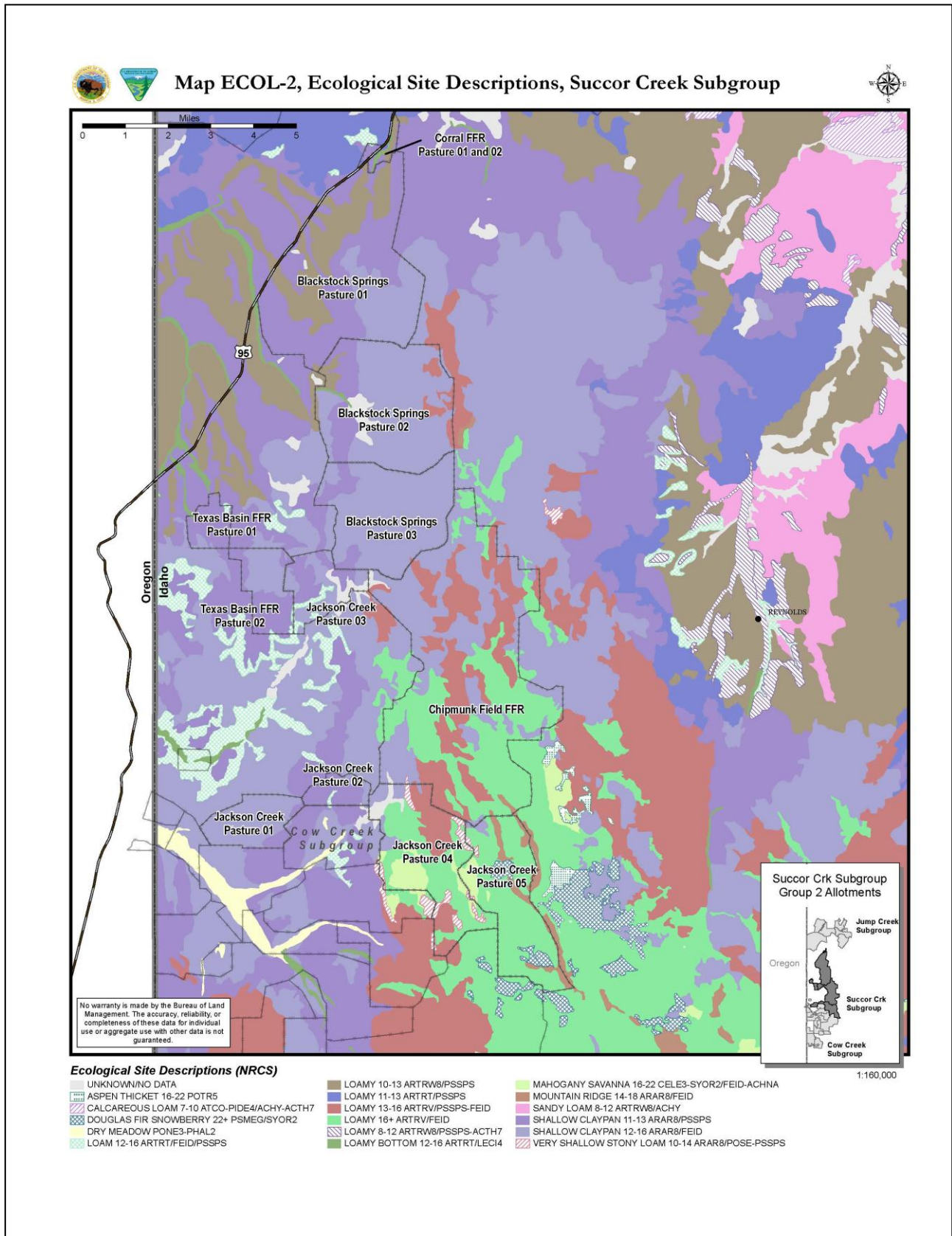
Map FIRE-1: Fire History, Jump Creek Subgroup



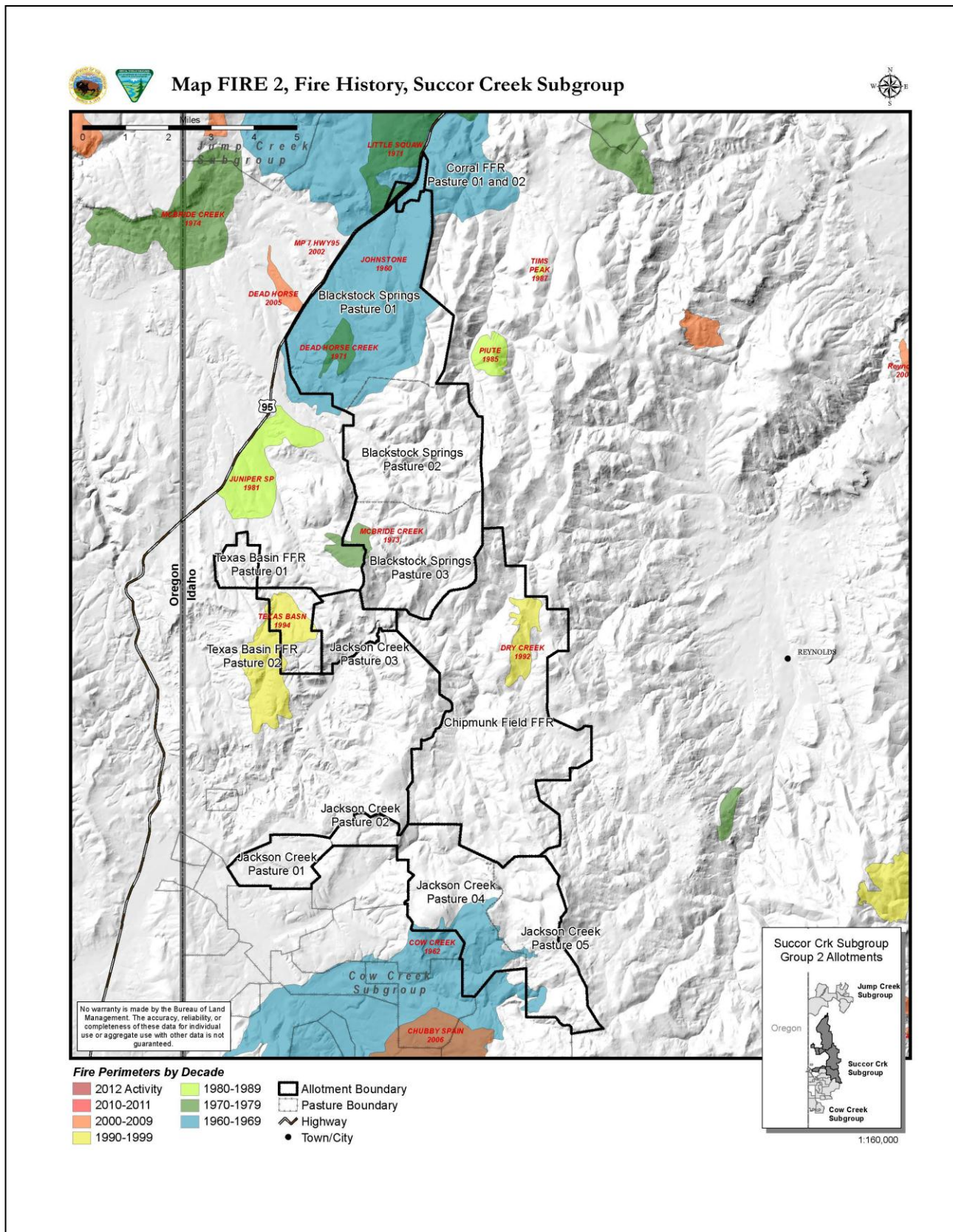
Map RNGE-1: Range Resources, Jump Creek Subgroup



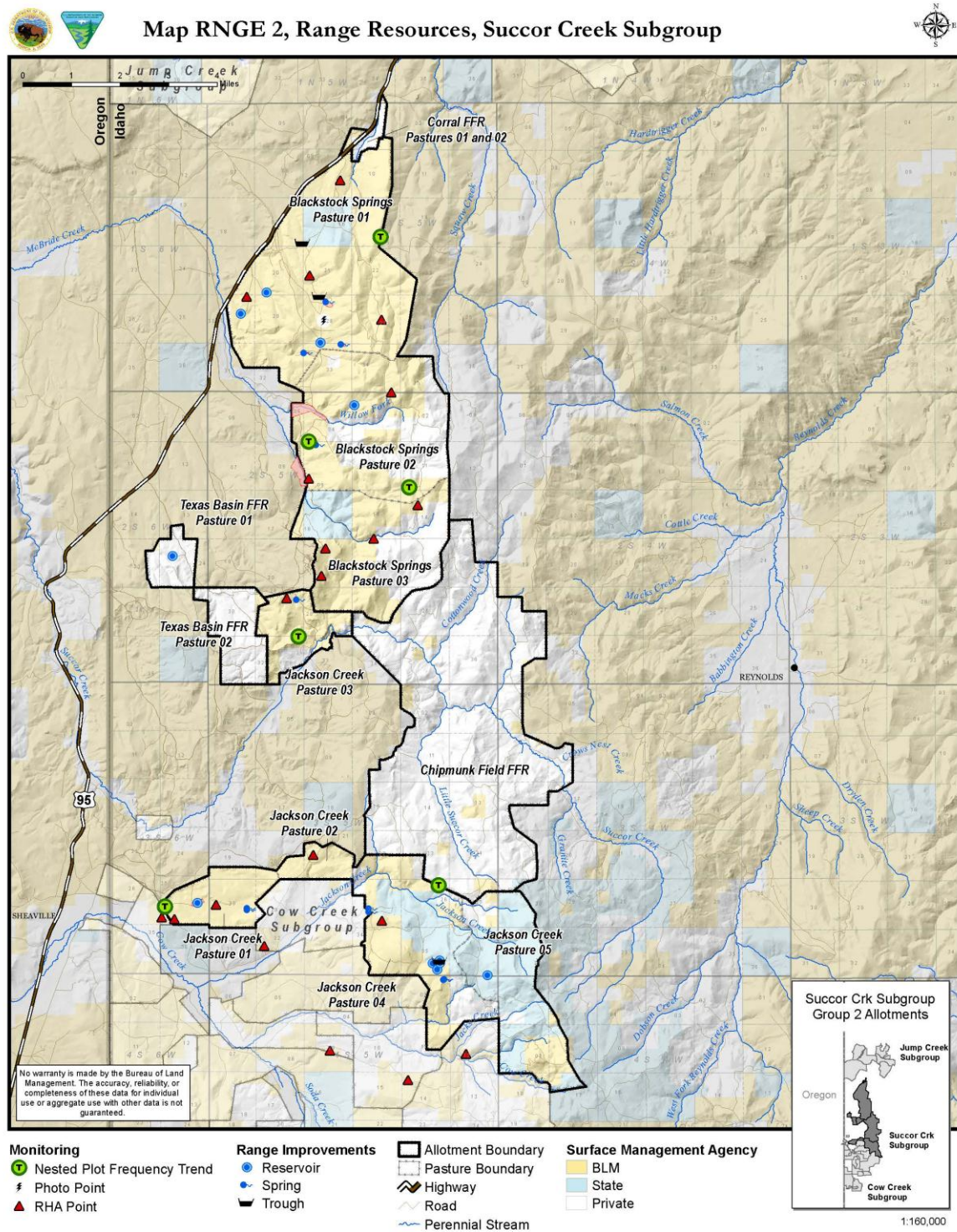
Map ECOL-2: Ecological Site Descriptions, Succor Creek Subgroup



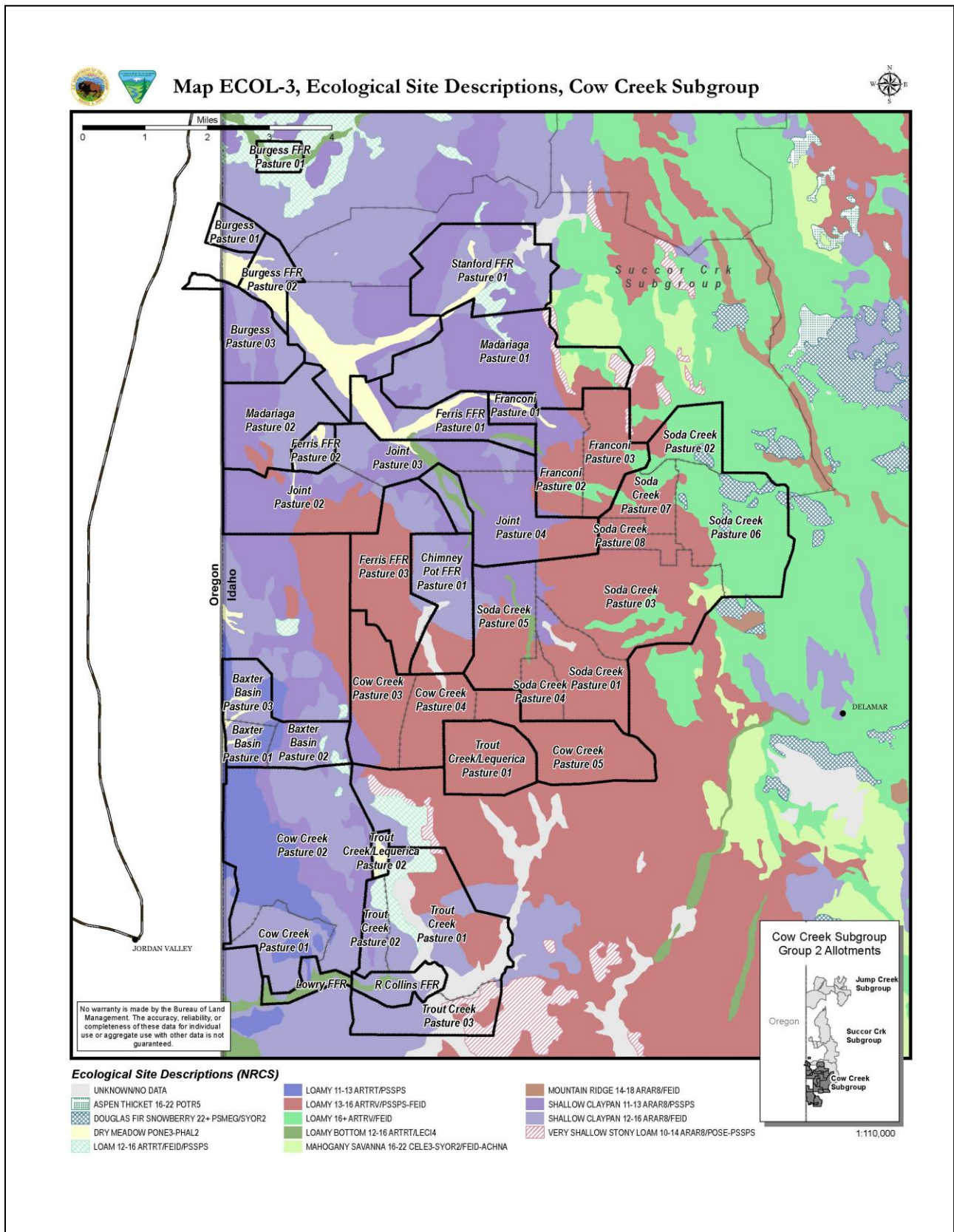
Map FIRE-2: Fire History, Succor Creek Subgroup



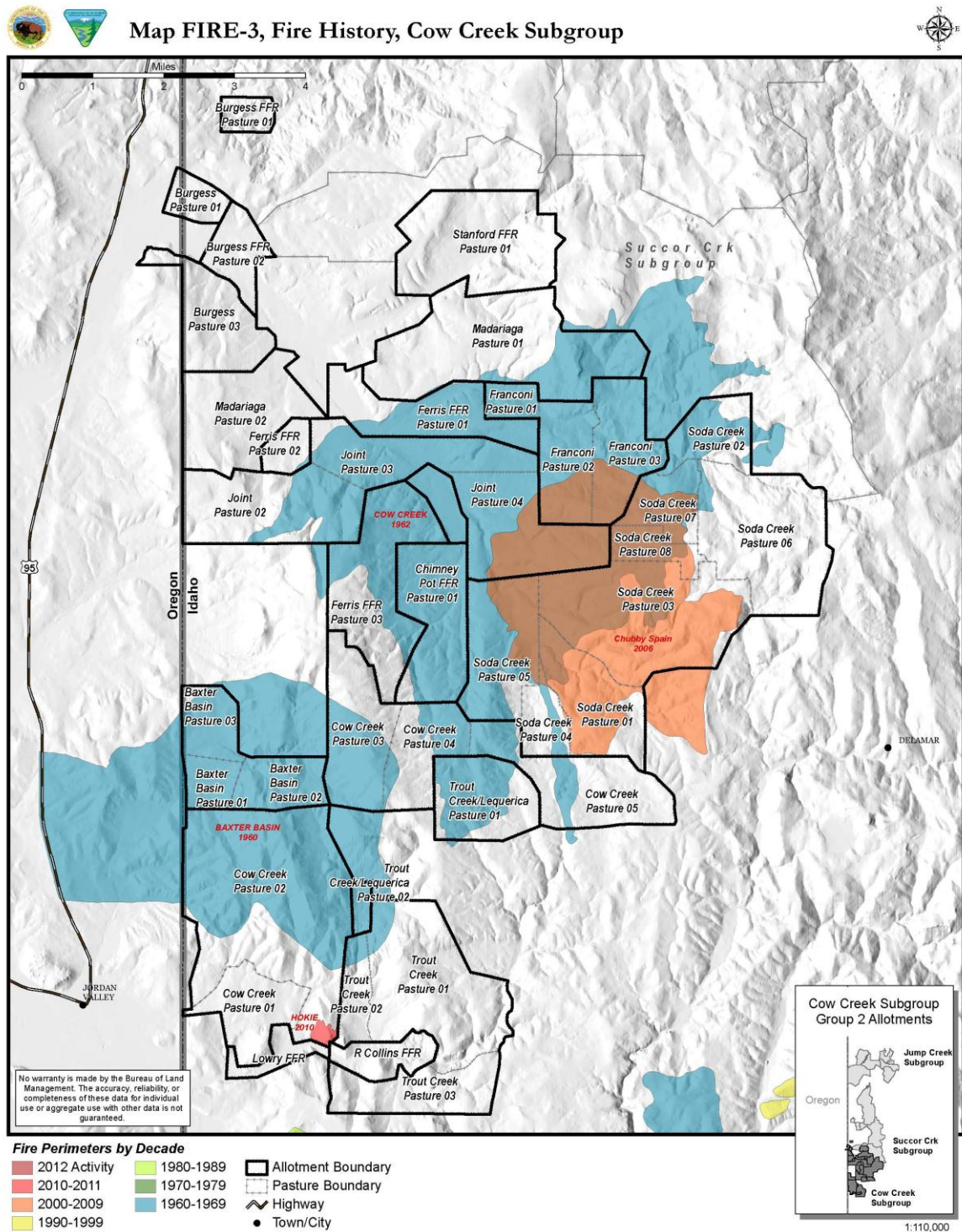
Map RNGE-2: Range Resources, Succor Creek Subgroup



Map ECOL-3: Ecological Site Descriptions, Cow Creek Subgroup



Map FIRE-3: Fire History, Cow Creek Subgroup



Map RNGE-3: Range Resources, Cow Creek Subgroup

